VOLUME 63 SUMMER 1960 NUMBER 2

THE BRYOLOGIST

Quarterly Journal of the American Bryological Society

EDITOR
HOWARD A. CRUM

ASSOCIATE EDITORS
MARGARET FULFORD LEWIS E. ANDERSON
WILLIAM C. STEERE WILLIAM L. CULBERSON

Alexander W. Evans—an appreciation *Rudolf M. Schuster* 73
Alexander W. Evans and lichenology *Mason E. Hale, Jr.* 81
Personal reflections on Alexander W. Evans *Lewis E. Anderson* 84
Bazzania chimantensis, a new species from Venezuela *Margaret Fulford* 88
Three new species of Fissidens *Howard Crum* 93
Fissidens flavosetus, a new species from Haiti *Ronald A. Pursell* 98
Mosses of Guam, Mariana Islands *Edwin B. Bartram* 101
Frullaniaceae of Burma. V. Two species of Frullania new to Burma *Ruth D. Svihla* 105
Lichens new to the state of Washington *Walter J. Eyerdam* 107
Bryophytes of southwest Missouri. III. Additions to the flora *Paul L. Redfearn, Jr.* 110
The mosses of Payne Co., Oklahoma *G. J. Ikenberry, C. D. Bird, and W. F. Mahler* 112
Notes on the current list of New Mexico Hepaticae *C. D. Bird* 114
Cololejeunea tuberculata found in Cuba *Sigfrid Arnell* 115
A preliminary list of Micronesian bryophytes *Harvey A. Miller* 116
Recent literature 125
News and notes 135

THE BRYOLOGIST.—A quarterly journal devoted to the study of North American mosses, hepatics, and lichens, published by the American Bryological Society. **Subscription price, in the United States, $5.00 per year, net; in all other countries, $5.15.**

Back volumes of THE BRYOLOGIST are available from Dr. Lewis E. Anderson, Department of Botany, Duke University, Durham, N. C.; or the Secretary-Treasurer, at the following prices: volumes 1-4, $1.25 each; volumes 5-36, $2.50 each (60 cents per individual number); volume 37, $3.00; volumes 38-45, $3.50 each (85 cents per individual number); volumes 46-49, $4.00 each; volume 50, $8.00; volumes 51-56, $6.00 each ($2.00 per individual number).

PUBLICATION OFFICE: Seeman Printery, Durham, N. C.

Address manuscripts to the Editor:

DR. HOWARD A. CRUM, National Museum of Canada, Ottawa, Ontario, Canada.

Manuscripts should be typewritten, double-spaced, on 8½ by 11 inch sheets. Only first copies (not carbons) should be submitted. Reprints of articles will be supplied at a reasonable price if ordered when corrected galley proof is returned.

Address subscriptions, applications for membership, and advertisements to the Secretary-Treasurer, DR. WILLIAM A. WEBER, University of Colorado, Boulder, Colo.

Address all specimens for identification directly to the Curator concerned.

Entered as second-class matter at the Post Office at Durham, N. C.

OFFICERS OF THE AMERICAN BRYOLOGICAL SOCIETY

President.....ROY F. CAIN
University of Toronto, Toronto 5, Ont.

Vice-President.....BETTY W. HIGINBOTHAM
Washington State University, Pullman

Secretary-Treasurer.....WILLIAM A. WEBER
University of Colorado, Boulder

Editor.....HOWARD A. CRUM
National Museum of Canada, Ottawa

Associate Editors
MARGARET FULFORD, W. C. STEERE, L. E. ANDERSON, W. L. CULBERSON

Curator of the Moss Herbarium.....LEWIS E. ANDERSON
Duke University, Durham, N. C.

Curator of the Hepatic Herbarium.....MARGARET FULFORD
University of Cincinnati, Cincinnati, O.

Curator of the Lichen Herbarium.....WM. A. WEBER
University of Colorado, Boulder

Director of the Moss Exchange.....E. H. KETCHLEDGE
State College of Forestry, Syracuse, N. Y.

AIBS Representative.....ELBERT L. LITTLE, JR.
U. S. Forest Service, Washington, D. C.

AAAS Representative.....MARGARET FULFORD
University of Cincinnati, Cincinnati, O.

THE BRYOLOGIST

JOURNAL OF

THE AMERICAN BRYOLOGICAL SOCIETY

VOLUME 63 SUMMER 1960 NUMBER 2

ALEXANDER W. EVANS—AN APPRECIATION

RUDOLF M. SCHUSTER[1]

With the death of Alexander W. Evans on December 6, 1959, in his 92nd year, a notable era in hepaticology ended, and a void was created that is impossible to fill. It is a tribute to Dr. Evans that although he concerned himself largely with lichenology during the last two decades of his life, his influence on bryology and on bryologists continues in undiminished form. Together with Spruce, he leaves a permanent mark on his field that time will not erase. Indeed, only two or possibly three hepaticologists have even approached Evans in scope and quality of research performed—namely Nees von Esenbeck, Spruce, and Gottsche. I greatly doubt that the appended bibliography of his hepaticological researches is fully complete; yet it testifies to the tremendous comprehension of his field which Evans attained. Although it is impossible to follow him uniformly in all cases, Evans' work remains in general the surest signpost for future investigations. Equally significant is the fact that even those of Evans' papers which were superficially regional in nature, such as his "Notes on New England Hepaticae" (1902-1923), contained so many original observations that they remain a rich source of information for present-day workers. At the opposite pole, his monographic works—on the American *Marchantia* species, *Acromastigum*, the Puerto Rican Lejeuneaceae, and others too numerous to mention—are so encyclopedic in nature and so replete with numerous original data that they, of necessity, will remain indefinitely the primary reference source for these groups. In many groups, such as the difficult *Lejeuneae*, with which he particularly concerned himself, his taxonomic viewpoints were so far advanced beyond his time that there can be no com-

[1] Dept. of Botany, University of Massachusetts, Amherst, Mass.

parison with the work of any other hepaticologist of his period. It is perhaps too facile, on such an occasion, to indulge in superlatives; yet, in this era of complacency and toleration of the mediocre, it behooves us to acknowledge and recognize extraordinary ability and endeavor and scientific integrity. This is particularly true in a field in which so much of the published research exhibits poor workmanship and is only of semi-professional status and of transient and often questionable value.

Perhaps as striking as the uniformly high caliber and enormous quantity of Evans' research is the fact that these were linked with an inherent simplicity and humility. I well recall, some years back, expressing my pleasure to Dr. Evans, that, after much difficulty, I was finally able to substantiate—and indeed, comprehend—some of his work that was then several decades old. His reaction was typical: a twinkle in his eyes, a smile, and an acknowledgment that "perhaps he had been right in his conclusions!" His charm and notable lack of pedantry were always manifest. Equally indicative was the fact that in all of his papers he scrupulously gave the source of specific concepts he adopted, if they did not originate with him. This integrity serves, equally, to document the origin of various concepts in the field. And, finally, perhaps most symptomatic of Evans' stature is that at an age when many a research worker has retired, or at least given up actively developing new ideas, Evans published (in 1939) a new and carefully conceived classification of the Hepaticae, abundantly and ably documented. His ability, at such an age, to do work of almost pioneer nature, is surely phenomenal. Also extraordinary is his work on the *Cladoniae*—a difficult group on which he became a world authority after having left the Hepaticae—started at an age when many feel they can justly rest on their laurels!

A. W. Evans was born May 17, 1868 in Buffalo, New York. His education was received at the Sheffield Scientific School at Yale, from which he graduated in 1890. Two years later he received the M.D. degree from the Yale Medical School; in this he followed in the footsteps of so many other early and illustrious New England biologists. He, however, never practiced medicine; his early interest in plants, particularly in the bryophytes, stimulated by D. C. Eaton (then Professor of Botany at Yale), led to his abandoning medicine for botany. His early interest in the Hepaticae is demonstrated by a specimen collected in April 1888—during his freshman year in college—still housed in the Yale Herbarium. This interest continued unabated, leading in 1892 (the year he earned his M.D. degree) to the publication of his first three papers on the Hepaticae. Of these papers, one was a general arrangement

of the genera of the Hepaticae; the other two dealt, respectively, with the Hepaticae of Hawaii and Patagonia. This demonstrates the degree to which Evans had by then penetrated into the field. From 1892 until the end of the 1930's—almost a forty-year span—there was hardly a period exceeding a year when one or more papers did not appear. A notable exception is the period from 1892-1894, during which he served a two-year term as interne in the Yale Medical School. In 1894 he went to Germany, studying for almost a year under Professor K. Kny at Berlin. In 1895 Evans was asked to assume charge of teaching botany at Yale, succeeding Eaton, who had died in June 1895. Evans served as Instructor (1895-1901), Assistant Professor (1901-1906), Daniel Cady Eaton Professor (1906-1936), and Professor Emeritus (1936-1959).

On assuming his new duties at Yale, Evans immediately undertook the preparation of a paper to serve as his dissertation for the Ph.D. which he obtained in 1899. The late G.E. Nichols (Annales Bryologici 11: 2. 1938) related the perhaps apocryphal story that "as the sole preceptor of botany at Yale" Evans had standards so high that the first paper which he prepared for a dissertation, his "Revision of the North American Species of *Frullania*"—still the most critical treatment of the genus for North America—failed to suffice and was rejected. Evans, the preceptor, therefore "insisted that Evans the candidate prepare a second dissertation!" Apocryphal or not, the story is clearly in line with the high standards characteristic of all Evans' published work. Furthermore, as Nichols pointed out, this was exactly the type of story which Evans, with his fine sense of humor, "would delight to tell about either himself or other people." Equally revealing is the manner in which Evans delighted in the classical *faux pas* committed by the late M. L. Fernald, who in ?1949, discussing the quality of writing in botanical literature, mentioned glowingly the excellence of the manuscripts submitted to *Rhodora* by "the late Alexander W. Evans." It surely is one of the ironies of fate that Fernald passed on to his reward two years later, while Evans was spared to us for a full decade, passing on in his 92nd year. It is also a pleasure to record that Dr. Evans remained vigorous and alert to the end. In early September 1959, just a short time before he died, I took Dr. Sinske Hattori to visit Dr. Evans at Yale. Although he deigned to use the elevator to go up to his office on the third floor of the Osborn Botanical Laboratory and seemed a little slower in his physical movements, his marvelous memory—and the equally marvelous alertness and clarity—were as always! And his office showed the same evidence of activity, with literature and specimens

everywhere, almost to the exclusion of table and floor space. The accompanying portrait, prepared from a color slide, was taken at the time of this last visit. An earlier portrait and an excellent account of Evans' career are to be found in the article by Nichols (*loc. cit.*). In the latter account are mentioned some other aspects of Dr. Evans' career which have not been touched upon in the preceding paragraphs, among them the rôle he played in training graduate students throughout the whole field of morphology—not only in the systematics of bryophytes.

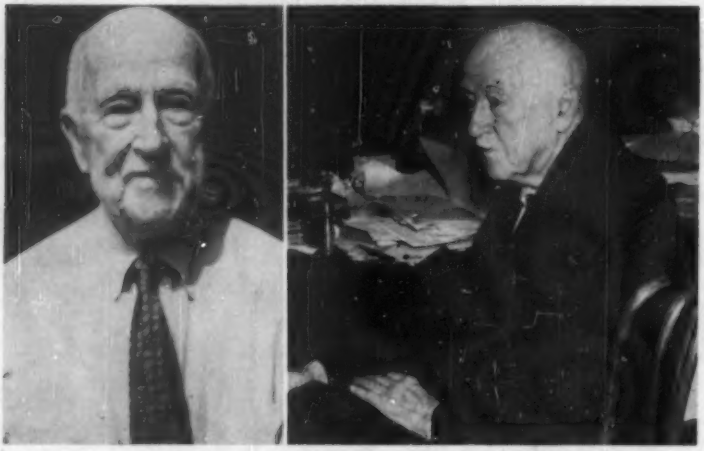


FIG. 1. Alexander W. Evans, at the age of 91. FIG. 2. Dr. Evans in his laboratory, March 1956 (photographed by H. A. Miller).

In spite of his characteristic modesty and simplicity—and a total lack of self-seeking—Dr. Evans achieved wide renown among botanists throughout the world. He was a fellow or member of the American Association for the Advancement of Science, the New England Botanical Club, the Botanical Society of America, the Connecticut Academy of Arts and Sciences, the American Academy of Arts and Sciences, and the Torrey Botanical Club. For many years he was an associate editor of *The Bryologist* and eventually was made an honorary member of the American Bryological Society. He was also associate editor and finally editor of the *Bulletin of the Torrey Botanical Club*. During the 50th Anniversary Meeting of the Botanical Society of America, he was honored with the award of a "Certificate of Merit" as one of 50 botanists who had made "outstanding contributions to botanical science." He was cited as one "who to a fruitful life as the honored

master of hepaticology has added a second as profitably devoted to the disentangling of the noble genus *Cladonia*."

PUBLICATIONS IN BRYOLOGY BY ALEXANDER W. EVANS

1891. A provisional list of the Hepaticae of the Hawaiian Islands. Trans. Conn. Acad. Arts and Sci. 8: 253-261, pl. 22-23.
1892. An arrangement of the genera of Hepaticae. Trans. Conn. Acad. Arts and Sci. 8: 262-280; 1-20 of reprint.
1892. List of liverworts from southern Patagonia. Contr. U. S. Nat. Herb. 1: 140-142, pl. 15-16.
1892. West Virginia liverworts, *in* Millspaugh's Preliminary catalogue of the flora of West Virginia. Bull. W. Va. Ag. Exper. Sta. 24: 495-498, fig. 1-5.
1893. Hepaticae, *in* Small and Vail, Report on the botanical exploration of southwestern Virginia during the season of 1892. Mem. Torrey Bot. Club 4: 191-195, pl. 81.
1893. Two new American Hepaticae. Bull. Torrey Bot. Club 20: 307-310, pl. 162-163.
1896. A note on *Jungermannia marchica* Nees. Bull. Torrey Bot. Club 23: 12-15, pl. 254-255.
1896. Notes on North American species of *Plagiochila*. Bot. Gaz. 21: 185-194, pl. 15-16.
1897. A revision of the North American species of *Frullania*, a genus of Hepaticae. Trans. Conn. Acad. Arts and Sci. 10 (1): 1-39, pl. 1-15.
1898. An enumeration of the Hepaticae collected by John B. Hatcher in southern Patagonia. Bull. Torrey Bot. Club 25: 407-431, pl. 345-348.
1898. Studies among our common Hepaticae. 1. *Jungermannia barbata* Schreb. Plant World 1: 97-102, pl. 4.
1898. Studies among our common Hepaticae. 2. *Lophocolea heterophylla*. Plant World 1: 133-137, pl. 6.
1898. Studies among our common Hepaticae. 3. *Lepidozia reptans* (L.) Dumort. Plant World 1: 182-186, fig. 1-15.
1899. List of Hepaticae collected along the international boundary by J. M. Holzinger, 1897. Minn. Bot. Studies 2: 193.
1899. Studies among our common Hepaticae. 4. *Porella platyphylla* (L.) Lindb. Plant World 2: 78-84, pl. 5.
1900. Papers from the Harriman Alaska Expedition. 5. Notes on the Hepaticae collected in Alaska. Proc. Wash. Acad. Sci. 2: 287-314, pl. 16-18. Also Harriman Alaska Series 5: 340-372, pl. 41-43.
1900. The Hawaiian Hepaticae of the tribe Jubuloideae. Trans. Conn. Acad. Arts and Sci. 10: 387-462, pl. 44-59.
1900. A new genus of Hepaticae from the Hawaiian Islands. Bull. Torrey Bot. Club 27: 97-104, pl. 1.
1900. A new type of branching in the leafy Hepaticae. Science, N.S. 11: 307.
1901. *Fossombronia salina* in Connecticut. Rhodora 3: 7-10, 1 fig.
1901. Hepaticae collected by William A. Setchell in northern Alaska. Zoe 5: 129-132.
1902. A new hepatic from the eastern United States. Bot. Gaz. 34: 372-375, pl. 12.
1902. Hepaticae, *in* Robinson's Flora of the Galapagos Islands. Proc. Amer. Acad. 38: 100-101.
1902. Hepaticae of Puerto Rico. 1. The species of *Leptolejeunea* including

an account of their vegetative reproduction. Bull. Torrey Bot. Club 29: 496-510, pl. 22-24.
1902. Notes on New England Hepaticae. 1. Rhodora 4: 207-213.
1902. The *Lejeuneae* of the United States and Canada. Mem. Torrey Bot. Club 8: 113-183, pl. 16-22
1902. Vegetative reproduction in *Leptolejeunea*. Science, N.S. 15: 46.
1903. Hepaticae of Puerto Rico. 2. *Drepanolejeunea*. Bull. Torrey Bot. Club 30: 19-41, pl. 1-6.
1903. Hepaticae of Puerto Rico. 3. *Harpalejeunea, Cyrtolejeunea, Euosmolejeunea* and *Trachylejeunea*. Bull. Torrey Bot. Club. 30: 544-563, pl. 20-22.
1903. *Odontoschisma macounii* and its North American allies. Bot. Gaz. 36: 321-348, pl. 18-20.
1903. Preliminary lists of New England plants. 11. Hepaticae. Rhodora 5: 170-173.
1903. Report on two collections of Hepaticae from northeastern Minnesota. Minn. Bot. Studies 3(15): 141-144.
1903. Yukon Hepaticae. Ottawa Nat. 17: 13-24, pl. 1-2.
1904. Hepaticae of Puerto Rico. 4. *Odontolejeunea, Cyclolejeunea* and *Prionolejeunea*. Bull. Torrey Bot. Club 31: 183-226, pl. 8-12.
1904. Notes on New England Hepaticae. 2. Rhodora 6: 165-174, 185-191, pl. 57.
1904. Vegetative reproduction in certain epiphyllous *Lejeuneae*. Science, N. S. 19: 485.
1905. A remarkable *Ptilidium* from Japan. Rev. Bryol. 32: 57-60, fig. 1-6.
1905. Diagnostic characters in the Jungermanniaceae. The Bryologist 8: 57-62, pl. 5.
1905. Hepaticae of Puerto Rico. 5. *Ceratolejeunea*. Bull. Torrey Bot. Club 32: 273-290, pl. 19-20.
1905. New or noteworthy Hepaticae from Florida. Bull. Torrey Bot. Club 32: 179-192, pl. 5.
1905. Notes on New England Hepaticae. 3. Rhodora 7: 52-58.
1906. Hepaticae of Puerto Rico. 6. *Cheilolejeunea, Rectolejeunea, Cystolejeunea* and *Pycnolejeunea*. Bull. Torrey Bot. Club 33: 1-25, pl. 1-3.
1906. Hepaticae of Vancouver Island. Postelsia 2(1906): 215-233.
1906. *Lepidozia sylvatica*. The Bryologist 9: 77-78.
1906. Notes on Japanese Hepaticae. Proc. Wash. Acad. Sci. 8: 141-166, pl. 6-8.
1906. Notes on New England Hepaticae. 4. Rhodora 8: 34-45.
1906. The Hepaticae of Bermuda. Bull. Torrey Bot. Club 33: 129-135, pl. 6.
1907. Hepaticae of Puerto Rico. 7. *Stictolejeunea, Neurolejeunea, Omphalanthus* and *Lopholejeunea*. Bull. Torrey Bot. Club 34: 1-34, pl. 1-4.
1907. Hepaticae of Puerto Rico. 8. *Symbiezidium, Marchesinia, Mastigolejeunea, Caudalejeunea* and *Bryopteris*. Bull. Torrey Bot. Club 34: 533-568, pl. 31-33.
1907. *Leucolejeunea*, a new genus of Hepaticae. Torreya 7: 225-229.
1907. Notes on New England Hepaticae. 5. Rhodora 9: 56-60, 65-73, pl. 73.
1907. The genus *Calypogeia* and its type species. The Bryologist 10: 24-30.
1908. Hepaticae of Puerto Rico. 9. *Brachiolejeunea, Ptychocoleus, Archilejeunea, Leucolejeunea* and *Anoplolejeunea*. Bull. Torrey Bot. Club 35: 155-179, pl. 6-8.
1908. *Lopholejeunea muelleriana* in Florida. The Bryologist 11: 45-46.
1908. New West Indian *Lejeuneae*. Bull. Torrey Bot. Club 35: 371-389, pl. 26-28.

1908. Notes on New England Hepaticae. 6. Rhodora 10: 185-193.
1908. The bryophytes of Connecticut. Bull. Conn. Geol. and Nat. Hist. Survey 11: 1-203 (with G. E. Nichols).
1908. The synonymy of three American Hepaticae. The Bryologist 11: 67-70.
1909. Notes on New England Hepaticae. 7. Rhodora 11: 185-195.
1910. Notes on New England Hepaticae. 8. Rhodora 12: 193-204.
1910. Notes on North American Hepaticae. 1. The Bryologist 13: 33-36.
1910. Vegetative Reproduction in *Metzgeria*. Ann. Bot. 24: 271-303, fig. 1-16.
1911. Hepaticae of Puerto Rico. 10. *Cololejeunea, Leptocolea,* and *Aphanolejeunea*. Bull. Torrey Bot. Club 38: 251-286, pl. 11-12, fig. 1-3.
1911. Notes on North American Hepaticae. 2. The Bryologist 14: 84-88.
1911. The hepatics of the Bahama Islands. Bull. Torrey Bot. Club 38: 205-222, pl. 9-10.
1912. A new *Frullania* from Florida. The Bryologist 15: 22-26, fig. 1-9.
1912. Branching in the leafy Hepaticae. Ann. Bot. 26: 1-37, fig. 1-36.
1912. Hepaticae of Puerto Rico. 11. *Diplasiolejeunea*. Bull. Torrey Bot. Club 39: 209-225, pl. 16-17.
1912. New West Indian *Lejeuneae*. II. Bull. Torrey Bot. Club 39: 603-611, pl. 45.
1912. Notes on New England Hepaticae. 9. Rhodora 14: 1-18.
1912. Notes on New England Hepaticae. 10. Rhodora 14: 209-225.
1912. Notes on North American Hepaticae. 3. The Bryologist 15: 54-63, pl. 2.
1913. Development of the peristome in *Ceratodon purpureus*. Bull. Torrey Bot. Club 40: 97-109, fig. 1-26 (with Henry D. Hooker, Jr.).
1913. Notes on North American Hepaticae. 4. The Bryologist 16: 49-55, fig. 1-7.
1913. Revised list of New England Hepaticae. Rhodora 15: 21-28.
1914. Hepaticae: Yale Peruvian Expedition of 1911. Trans. Conn. Acad. Arts and Sci. 18: 291-345, fig. 1-11.
1914. Notes on New England Hepaticae. 11. Rhodora 16: 62-76.
1914. Notes on North American Hepaticae. 6. The Bryologist 17: 87-92.
1914. Report on the Hepaticae of Alaska. Bull. Torrey Bot. Club 41: 577-616, pl. 21.
1915. Notes on New England Hepaticae. 12. Rhodora 17: 107-120.
1915. Notes on North American Hepaticae. 6. The Bryologist 18: 81-91, fig. 1-9, pl. 1.
1915. Preliminary list of Colorado Hepaticae. The Bryologist 18: 44-47.
1915. The genus *Plagiochasma* and its North American species. Bull. Torrey Bot. Club 42: 259-308, fig. 1-8.
1916. Additions to the hepatic flora of Quebec. The Bryologist 19: 27-30.
1916. A new species of *Metzgeria* from the Galapagos Islands. Torreya 16: 67-70, fig. 1-5.
1916. Lichens and bryophytes at Cinchona. Science, N.S. 43: 918.
1916. Notes on New England Hepaticae. 13. Rhodora 18: 74-85, 103-120, fig. 1-40, pl. 120.
1917. A new *Lejeunea* from Bermuda and the West Indies. Bull. Torrey Bot. Club 44: 525-528, pl. 24.
1917. Notes on New England Hepaticae. 14. Rhodora 19: 263-272.
1917. Notes on North American Hepaticae. 7. The Bryologist 20: 17-28, pl. 2.
1917. Notes on the genus *Herberta*, with a revision of the species known

from Europe, Canada and the United States. Bull. Torrey Bot. Club 44: 191-222, fig. 1-29, pl. 8.
1917. Preliminary list of Arizona Hepaticae. The Bryologist 20: 60-62.
1917. The American species of *Marchantia*. Trans. Conn. Acad. Arts and Sci. 21: 201-313, fig. 1-20.
1918. Hepaticae of St. Croix, St. Jan, St. Thomas and Tortola. Mem. Brooklyn Bot. Garden 1: 104-109.
1918. Noteworthy *Lejeuneae* from Florida. Amer. Jour. Bot. 5: 131-150, fig. 1-5.
1918. The air chambers of *Grimaldia fragrans*. Bull. Torrey Bot. Club 45: 235-251, fig. 1-14.
1919. A new *Riccia* from Peru. Torreya 19: 85-88, fig. 1.
1919. A taxonomic study of *Dumortiera*. Bull. Torrey Bot. Club 46: 167-182.
1919. Notes on New England Hepaticae. 15. Rhodora 21: 149-169, fig. 1-14, pl. 126.
1919. Notes on North American Hepaticae. 8. The Bryologist 22: 54-73, fig. 1-15, pl. 2.
1919. Three South American species of *Asterella*. Bull. Torrey Bot. Club 46: 469-480.
1920. Class 2. Hepaticae, *in* Britton and Millspaugh, The Bahama Flora, pp. 500-521. New York.
1920. The North American Species of *Asterella*. Contr. U. S. Nat. Herb. 20(8): 247-312.
1921. Abruzzi Hepaticae. Rev. Bryol. 47: 57-58.
1921. Notes on New England Hepaticae. 16. Rhodora 23: 281-284.
1921. *Taxilejeunea pterogonia* and certain allied species. Bull. Torrey Bot. Club 48: 107-136, pl. 2, fig. 1-22.
1921. The genus *Riccardia* in Chile. Trans. Conn. Acad. Arts and Sci. 25: 93-209, fig. 1-13.
1922. Notes on North American Hepaticae. 9. The Bryologist 25: 25-33, pl. 1.
1922. Recent studies of certain species of *Riccia*. The Bryologist 25: 81-86.
1923. Corsiniaceae. No. Amer. Flora 14: 29-30: Targioniaceae. *Ibid.* 14: 31-33; Sauteriaceae. *Ibid.* 14: 35-37; Rebouliaceae. *Ibid.* 14: 39-56; Marchantiaceae. *Ibid.* 57-66.
1923. Notes on New England Hepaticae. 17. Rhodora 25: 74-83; 89-98.
1923. Notes on North American Hepaticae. 10. The Bryologist 26: 55-67.
1923. Notes on the Hepaticae of California. Proc. Calif. Acad. Sci. 4, 13(6): 111-130.
1923. Second revised list of New England Hepaticae. Rhodora 25: 192-199.
1923. The Chilean species of *Metzgeria*. Proc. Amer. Acad. Arts and Sci. 58: 271-324, fig. 1-10.
1924. Report on the Hepaticae of Nebraska. The Bryologist 27: 49-52.
1925. A taxonomic study of *Hymenophytum*. Bull. Torrey Bot. Club 52: 491-506, fig. 1-19.
1925. Sullivant Moss Society exchange list of Hepaticae found in the United States, Canada, and arctic America. The Bryologist 28: 79-82.
1925. The lobate species of *Symphyogyna*. Trans. Conn. Acad. Arts and Sci. 27: 1-50, fig. 1-13.
1926. The Hepaticae of Fisher's Island. Torreya 26: 85-86.
1927. A further study of the American species of *Symphyogyna*. Trans. Conn. Acad. Arts and Sci. 28: 295-354, fig. 1-12, pl. 1.
1930. Three species of *Scapania* from western North America. Bull. Torrey Bot. Club 57: 87-111, fig. 1-8.

1930. Two species of *Lejeunea* from Chile. Ann. Bryol. 3: 83-88, fig. 1-2.
1931. The thallose Hepaticae of the Juan Fernandez Islands, *in* Skottsberg's The Natural History of Juan Fernandez and Easter Island 2: 553-586, fig. 1-6.
1932. A new *Plagiochasma* from Texas. Amer. Jour. Bot. 19: 627-631, fig. 1-7.
1933. Some representative species of *Bazzania* from Sumatra. Papers Mich. Acad. Sci., Arts, and Letters. 17: 69-118, pl. 13-18.
1934. A revision of the genus *Acromastigum*. Ann. Bryol., Suppl. 3: i-viii, 1-178, 40 fig.
1935. Recent segregates from the genera *Lophozia* and *Sphenolobus*. The Bryologist 38: 61-70.
1935. The anatomy of the stem in the Lejeuneaceae. Bull. Torrey Bot. Club 62: 187-214, 259-280, fig. 1-8.
1935. The liverwort flora of the upper Michigan peninsula. The Bryologist 38: 81-91.
1936. A study of five New England species of *Scapania*. Rhodora 38: 77-90.
1937. A history of the genus *Pallavicinia*. The Bryologist 40: 25-33.
1937. A preliminary check list of the Hepaticae of Europe and America (north of Mexico). Ann. Bryol. 10: 3-8 (with H. Buch and F. Verdoorn.)
1938. A history of the genera *Nardia* and *Plectocolea*. Ann. Bryol. 10(1937): 36-42.
1938. A new species of *Chiloscyphus* from Utah. The Bryologist 41: 49-56, fig. 1-18.
1938. Notes on the genus *Cololejeunea*. The Bryologist 41: 71-82, fig. 1-20.
1938. The invalidity of the genus *Grimaldia* of Raddi. Chron. Bot. 4: 223-225.
1938. The structure of the capsule wall in certain species of *Riccardia*. Ann. Bryol. 10(1937): 20-35, fig. 1-6.
1939. The classification of the Hepaticae. Bot. Rev. 5: 49-96.
1940. List of Hepaticae found in the United States, Canada, and arctic America. The Bryologist 43: 133-138.
1940. The American species of *Stylolejeunea*. The Bryologist 43: 1-4.

ALEXANDER W. EVANS AND LICHENOLOGY

MASON E. HALE, JR.[1]

It will come as a surprise to many hepaticologists that Alexander W. Evans was the foremost authority on the lichen genus *Cladonia* in the latter half of his long career, just as most lichenologists are astonished to learn of his reputation in hepatics. Evans actually started collecting lichens in Connecticut about 1924 and made extensive and methodical county and township records. Most of the specimens were identified by G. K. Merrill. The results of this field work were summarized in a Catalogue of Connecticut

[1] Smithsonian Institution, Washington 25, D. C.

lichens (1926), with later additions (1927). In the next three years there was a dramatic concentration of his efforts in the study of *Cladonia*, culminated by a magnificently documented *Cladonia* flora of Connecticut (1930). From this point on, for the next 30 years, he specialized exclusively in this large, difficult genus and only very rarely was willing to identify other lichens or hepatics.

Evans' major scientific achievement in lichenology was the adoption of the microchemical methods of the Japanese botanist Asahina to differentiate species of *Cladonia*. Evans could easily have maintained the classical taxonomic traditions of his European colleagues, especially Sandstede and Vainio, but instead he immediately mastered the microchemical techniques which Asahina himself had just discovered. It is really amazing that although he was not a chemist, Evans was able to recognize and prove the presence of ursolic acid in *Cladonia mitis* before Asahina did. His acute observations also led to the discovery of rangiformic acid in *C. mitis*. His studies on the chemistry of North American *Cladoniae* will not be superseded for many years, and it will take present day lichenologists years simply to assimilate and appreciate all that he accomplished.

Evans had a narrow species concept, but he was not a capricious "splitter." His deep familiarity with the chemical and morphological variability of *Cladonia* species, gained from unhurried field and laboratory study, enabled him to recognize many taxa which less critical workers would overlook or ignore. I remember well the hours that he spent in studying species in the *Cladonia calycantha-C. verticillata* group from the southeastern United States. He had discovered a chemical variant with psoromic acid in 1948 but was hardput to correlate the chemistry with any morphological characters. After four years of deliberation he described it as a new species, *C. rappii*, differentiated from *C. calycantha* by distinct chemical characters and by subtle but demonstrable morphological traits. Evans used chemistry as a practical aid in identification and as a species criterion to the fullest extent. His treatment of "chemical species" was so careful and logical that chemical methods have become essential ingredients in the taxonomy of *Cladonia*.

Most taxonomists would be amazed to see how very cautious Evans was when identifying individual specimens. He was constantly besieged by correspondents who all too often sent in scrappy, ill-pressed, and poorly labeled material. He carefully pressed the good specimens and wrote out labels by hand. He would then identify a specimen to species only if it were well-developed and normal. All other specimens were discarded or left unnamed.

Evans made truly exhaustive studies before publishing an article. For example, he published *Cladonia* floras for only four states, Vermont, Connecticut, New Jersey, and Florida, states in which he had done considerable field work. It would have been inconceivable to him to publish a *Cladonia* flora for California, since he had not collected there. He critically examined sometimes hundreds of specimens for his shorter articles dealing with only a few species. His articles are written with simplicity and directness; he rarely deviated from his main theme or indulged in criticism of other lichenologists.

Evans will be long remembered as a modest person with uncompromising standards of taxonomic research. He made full use of his long period of retirement to bring order out of chaos in *Cladonia* and to establish chemistry as a taxonomic criterion.

Evans' Papers on Lichenology

Catalogue of the lichens of Connecticut. Conn. State Geol. Nat. Hist. Survey, Bull. 37: 1-56. 1926 [with Rose Meyrowitz].

Notes on Connecticut lichens. Rhodora 29: 97-105. 1927.

The *Cladoniae* of Connecticut. Trans. Conn. Acad. Arts Sci. 30: 357-510. 1930.

Notes on the *Cladoniae* of Connecticut. Rhodora 34: 121-124, 153-164. 1932.

Notes on the *Cladoniae* of Connecticut. II. Rhodora 37: 33-57. 1935.

The *Cladoniae* of New Jersey. Torreya 35: 81-109. 1935.

Notes on the *Cladoniae* of Connecticut. III. Rhodora 40: 4-26. 1938.

The *Cladoniae* of New Jersey—Supplement. Torreya 38: 137-149. 1938.

The *Cladoniae* of New Jersey—Second supplement. Torreya 40: 141-165. 1940.

Asahina's microchemical studies on the *Cladoniae*. Bull. Torrey Bot. Club 70: 139-151. 1943.

Microchemical studies on the genus *Cladonia*, subgenus Cladina. Rhodora 45: 417-438. 1943.

On *Cladonia polycarpia* Merrill. The Bryologist 47: 49-56. 1944.

Supplementary report on the *Cladoniae* of Connecticut. Trans. Conn. Acad. Arts Sci. 35: 521-626. 1944.

A study of certain North American *Cladoniae*. The Bryologist 50: 14-51. 1947.

The *Cladoniae* of Vermont. The Bryologist 50: 221-246. 1947.

Notes on the *Cladoniae* of Connecticut. IV. Rhodora 52: 77-123. 1950.

A new name for *Cladonia cubana* (Vainio) Evans. The Bryologist 53: 124. 1950.

On *Cladonia transcendens* Vainio. The Bryologist 54: 224-230. 1951.

The *Cladoniae* of Florida. Trans. Conn. Acad. Arts Sci. 38: 249-336. 1952.

Cladonia ecmocyna in North America. Rhodora 54: 261-271. 1952.

Cladonia subrangiformis in North America. Rhodora 56: 266-272. 1954.

Three species of *Cladonia* from Patagonia. Rev. Bryol. et Lichén. 24: 132-137. 1955.

Notes on North American *Cladoniae*. The Bryologist 58: 93-112. 1955.

PERSONAL REFLECTIONS ON ALEXANDER W. EVANS

LEWIS E. ANDERSON[1]

My associations with Dr. Alexander W. Evans were mainly in the field, where we spent many delightful hours together during the late 1930's. In 1938, Dr. Evans' daughter enrolled in the University of North Carolina, and he and Mrs. Evans, charmed with the quiet village of Chapel Hill, spent a large share of their time there during 1938 and 1939. His visits to Duke during this period were frequent, and both Professor H. L. Blomquist and I looked forward with much pleasure to them, and we spent many enjoyable hours discussing mutual bryological interests and other topical matters. Unfortunately for hepaticology Dr. Evans had already made his mysterious exit from research in that field and was in the early stages of his studies on *Cladonia*. An avid collector and field man for most of his life, he began immediately to collect *Cladoniae* in the Durham-Chapel Hill region. At this time I was in the midst of field studies on the mosses of North Carolina but was hampered by a lack of funds for travel. Dr. Evans and I joined forces, and I provided an automobile and drove while he paid for transportation and a large share of living costs. This mutual but one-sided arrangement continued for more than two years and involved countless weekends, holidays, and a six-week period during the summer of 1939. Together we traveled more than 15,000 miles and managed to collect in nearly every county in the Piedmont and Coastal Plain of the two Carolinas. The specimens he gathered during these trips formed a significant part of the material upon which he based his Eastern studies of *Cladoniae*. My collections of mosses totaled more than 4000 numbers. The impressions of Dr. Evans recorded here stem mainly from the tremendously rich experience of these travels.

Already past 70 in 1938 and forbidden by his physician to collect in mountainous terrain, Dr. Evans had a strength and stamina in the field which astonished me. He was a man of medium height, with a strong tendency toward paunchiness; yet his endurance was nothing short of remarkable. He walked at a slow but steady pace and never seemed to tire. He refrained from climbing but never balked at tangled underbrush, swamps, pocosins, or bogs. A boat ride to Smith's Island off the coast of North Carolina necessitated wading ashore some 200 yards in more than waist-deep water, but Dr. Evans took this in stride, while the skipper looked on in amaze-

[1] Dept. of Botany, Duke University, Durham, N. C.

FIG. 1. Alexander W. Evans (right) and A. J. Grout on Currituck Sound, North Carolina, in the Spring of 1939.

ment at such activity in a 72-year old. It was this vigor and stamina that was to carry Dr. Evans through more than 20 years of additional active and productive work. He stubbornly refused to use a collecting bag in the field, using instead several large paper sacks which he held precariously between his fingers as he strolled along. These he often dropped along the way, and in spite of otherwise remarkably well-ordered habits he was not above mixing species indiscriminately in his various sacks. The plants of course were meticulously cleaned and separated later during the pressing operation, for his finished specimens were beautifully prepared.

Dr. Evans' field clothes were worth noting. Except in the very hottest weather he wore a tie and coat in combination with the most disreputable looking pants and shoes. It was what he called looking "half respectable."

I never saw Dr. Evans angry or emotionally upset. However uncomfortable or disagreeable conditions or events might be, he could always adjust to them with calm and with the brightest perspective. Whether it was a sudden downpour of rain, the slippery bank of a river that caused him to lose footing and plunge into water up to his neck, incredibly bad food, hoards of vicious mosquitoes, or other discomforts of the field, he never complained and invariably found humor in situations that arose. This stood him well in later years when he weathered the tragic circumstances of his daughter's death, an ordeal that would have broken an ordinary man. His letters to me, however, during this unfortunate period remained spirited, optimistic and uncomplaining.

Numerous reasons have been advanced to explain Dr. Evans' shift of research from hepatics to lichens, but no satisfactory explanation has ever been offered. His own explanation to me was very simple—namely that he had developed an intense interest in *Cladonia* and that was that. He admitted that for many years he had hoped to prepare an hepatic flora of North America, but claimed that the enormity of the work required to complete the task satisfactorily was greater than he could cope with. It is true that he was appalled at the precipitous appearance of Frye and Clark's work, and this may have been a factor in his discouragement, but he assured me that it was not the cause of his shift to lichenology. Dr. Evans liked to point with good humor to Frye and Clark's having synonymized one of his species, followed in the text by "Specimens examined: none."

In the spring of 1938, Dr. A. J. Grout on his way north to Newfane from his winter home in Manatee, Florida, chanced to visit Dr. Blomquist and me while Dr. Evans was in the area. This became the occasion of a memorable field trip in which Evans,

Grout, Blomquist, and I collected for several days in the Coastal Plain of North Carolina and also visited Roanoke Island. No stronger contrast in personalities could be imagined than those of Grout and Evans. Dr. Evans' mild voice, his modest retiring nature, his seeming unawareness of his tremendous accomplishments, his strong cultural interests in art, music, and history, and his lack of interest in finances contrasted vigorously with Dr. Grout's loud and almost boisterous manner, an acute awareness of his accomplishments which he could boast about with the slightest encouragement, his almost total disinterest in the arts, and his complete preoccupation with money. The two men had been friends for years, and Dr. Blomquist and I were treated to several memorable days of exchanges of kidding and banter between them. Grout was on the verge of finishing his *Moss Flora of North America* and twitted Evans constantly about his failure to do the hepatic flora. Dr. Evans took this in the best of humor, inserting now and then penetrating retorts concerning thoroughness, scholarliness and other qualities that he deemed necessary in a definitive flora. Grout brushed these objections aside, emphasizing his point of view that it is more important to get the job done, that scholarliness, accuracy and completeness should be sacrificed in favor of finishing the work. Evans' position that a decent flora should be preceded by careful systematic revisions, genus by genus and species by species, until there is enough understanding to write a flora is certainly defensible on scholarly and scientific grounds. Grout's policy of forging ahead, understanding or not, making a start and having something to work with, perhaps has practical merit also. Those of us who have to use Grout's work, however, and who are faced with the continual task of straightening out his errors of haste, cast more than an occasional wistful glance toward the thorough, careful, and scholarly approach of Alexander W. Evans.

It is exceedingly difficult to write about Dr. Evans without seeming to overstate the usual niceties expected in articles of this sort—because he *was* a nice man and a fine gentleman in every sense. His quiet and genuine modesty, his sense of humility, his continual and almost overpowering regard for others, his brilliant but often subtle sense of humor, and his tremendous personal integrity formed the hard core of his lovable personality. These traits seemed almost to be etched in his face in later years. Somewhat heavy of jowl and for many years afflicted with a slight but very noticeable palsy he had a way of looking at one so that his face would literally light up, and his eyes would twinkle and somehow communicate a mischievous quality that one cannot forget.

He was certainly not a dynamic or forceful person; he was scarcely a botanical leader in any political sense, and yet he was selected as one of fifty outstanding botanists by the Botanical Society of America on its fiftieth anniversary; he was unquestionably a mediocre or perhaps even a poor administrator, certainly by his own admission, and scarcely distinguished himself as chairman of botany at Yale, but botany remained very much alive and retained its identity and scholarly dignity during his tenure as head. His failure to produce an hepatic flora of North America is perhaps indefensible, and yet his enormous contributions to this field and to lichenology, as shown in the preceding articles, are unparalleled and are likely to remain so for a long time. But perhaps equally important will be the lasting impact of one of the most lovable personalities that botany has known.

BAZZANIA CHIMANTENSIS, A NEW SPECIES FROM VENEZUELA

MARGARET FULFORD[1, 2]

This new species, collected by Julian A. Steyermark during the Chicago Natural Museum Expedition to Venezuela in 1953, is of special interest because of the unusual configuration of its underleaves, which are quadrifid for half their length. For this reason the species belongs to a different section from the other South American species of *Bazzania* and is the first representative of the section FISSISTIPULAE to be found on this Continent. This section of the genus was established by Stephani (1886, p. 244) to include species in which the underleaves were deeply incised or long-toothed and in which the leaves were neither entire, bidentate, serrulate, connate, appendiculate nor vittate (Schiffner, 1893, p. 101; Stephani, 1908, p. 413). In a later monographic study of the genus in the Americas (Fulford, 1956, p. 124), I interpreted this section—as Stephani and Schiffner had done earlier—to include the species in which (a) the underleaves were divided to the middle into long lobes or teeth and (b) the three-toothed leaves were not serrulate along the margins, were not connate with the underleaves, and were without a vitta or appendages or conspicuous auricles at the ventral base.

[1] Division of Biological Sciences, University of Cincinnati, Cincinnati, O.
[2] Work related to a project supported by National Science Foundation grant no. G7147.

None of the American species which Stephani had included in the section FISSISTIPULAE and none of the species described since that time possess the combination of characters which delimit this Section. It had been assumed until now that the section was not represented in the Americas. With the finding of this distinctive new species in Venezuela and, in consequence, with the occurrence of an additional section or evolutionary trend of the genus in South America, some thought-provoking questions are raised as to the possible origin of this species, its relationship to the other American species, its geographical affinities and migration routes, and its age.

I wish to thank my colleague, Dr. H. R. Muegel, who has prepared the Latin diagnosis, and my assistants, Miss Jane Taylor and Dr. R. Hatcher, who have helped with the drawings.

Bazzania chimantensis n. sp.[3] Figs. 1-7. Plants small to medium in size, in large, depressed, brown mats. Stems yellow-brown, often greenish at the growing tips, with leaves to 1.5 mm. broad, often more slender, to 6-8 cm. long, with occasional dichotomies which form an acute angle; ventral intercalary branches flagelliform, frequent, long, the scale leaves squarrose, or rarely leafy. Rhizoids not seen. The line of leaf insertion curved in the upper part; the incubous leaves widely spreading, distant to approximate, usually plane, brittle, often broken but not truly caducous, variable in outline, rectangular or more rarely ovate, the margins uneven, conspicuously crenulate throughout, averaging 0.75-0.8 mm. long, 0.45-0.5 mm. wide at the base, the dorsal margin convex from a usually rounded base, the ventral margin straight, little narrowed to the transversely or more rarely obliquely truncate tri-(bi-)dentate apex; the teeth long, mostly equal, 2-4 cells broad at the base, to 12 cells long with half the length a crenulate, uniseriate tip, the sinuses deep, usually narrow, V-shaped; cells of the apical portion below the teeth 36-45 $\mu \times 36\ \mu$, with very large, spherical trigones separated by narrow pits or coalesced to form a very thick cell wall, the cell lumina stellate, the cuticle faintly verruculose, the cells of the rest of the leaf similar, scarcely larger, a vitta not differentiated. Underleaves conspicuous, distant to approximate, little broader than the stem, subquadrate-orbicular in outline, tending to be squarrose, averaging

[3]Caules flavo-fusculi, longi, graciles, haud ramosi; folia rectangulares vel ovates cum marginibus irregulariter crenulatis dentibus longis cum apicibus uniseriatis, 3-6 cellulis; folii cellulae 36-45 $\mu \times 36\ \mu$, trigones valde grandes sphaericales, distincti cum poris parietibus tenuibus vel coalescentibus; amphigastria subquadrata, quod medius est inter maximum et minimum 0.36 mm., crenulates quadrifida usque ad medium cum dentibus gracilibus, apicibus uniseriatis 2-4 cellulibus.

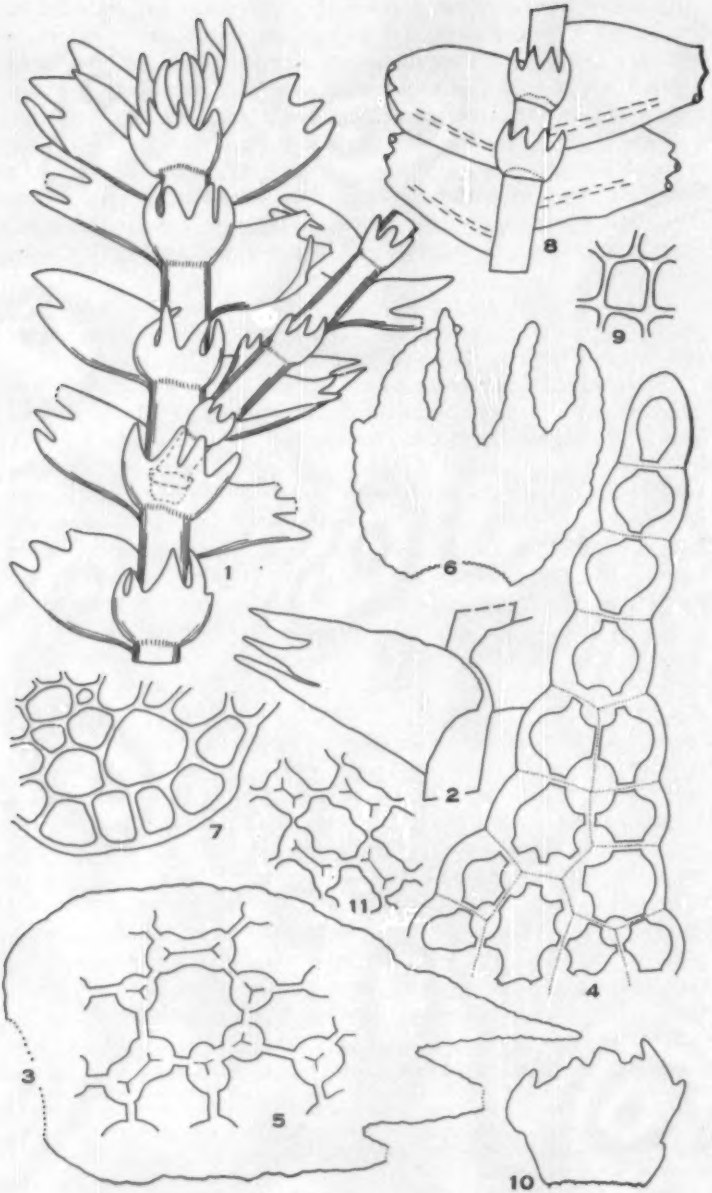


FIG. 1-7. *B. chimantensis*. 1. Portion of stem with a ventral intercalary

0.36 mm. long and broad, divided to the middle into 4 slender, lanceolate to linear teeth, 2-3 cells broad at the base, ending in a uniseriate row of 2-4 crenulate cells, or 2-celled for most of the length, the sinuses V- or U-shaped, the lateral margins convex or more rarely with a broad lobe; cells as in the leaves; ♂ and ♀ inflorescences and sporophyte not seen.

HABITAT: In large mats on a vertical sandstone boulder on forested slope. DISTRIBUTION: Estado Bolivar, Chimantá Massif: vicinity of camp 3, northwestern part of Abacapa-tepui, 1300 m., *J. Steyermark* 75216, in 1953, the type (F, NY).

The distinguishing characters of the species are its subquadrate, crenulate underleaves which are divided to the middle into four slender, crenulate teeth with uniseriate tips, the crenulate leaves with three, long, slender teeth with uniseriate tips of 4-6 cells, and the large cells of the leaves and underleaves, with very large, spherical trigones which are separated by narrow pits or are coalesced to form a very thick cell wall.

On the basis of the combination of morphological structures of the leaves and underleaves, this new species shows no very close relationship to any one South American species of *Bazzania*. The general pattern of the leaf is suggestive of *B. aurescens*, which was first described by Spruce from Peru. The leaves of the latter are 1.5-2 mm. long, 0.7-0.8 mm. wide at the base, and the teeth are variable, usually crenulate, slender, long, with a uniseriate tip,[4] and the leaf cells are large, 24-36 μ, with large, rounded trigones. On the basis of leaf characters alone, the two species might be considered to be closely related, although the leaves of the new species are smaller, the teeth are mostly longer with long tips, and the leaf cells and trigones are regularly larger.

However, the underleaves of the two are very different. Those of *B. aurescens* are 0.6-0.7 mm., subquadrate, with the apex irregularly incised to form unequal marginal teeth and lobes (*fig.* 10), while the subquadrate underleaves of the new species are only half

[4] This is true of the plants of the original collection but not of all of the plants more recently assigned to this species (see Fulford, 1959, p. 328).

leafy branch, × 80. 2. Portion of stem, dorsal view, showing leaf insertion, × 80. 3. Leaf, × 180. 4. Tooth of a leaf showing the very thick cell walls, large trigones, and crenulate margin, × 350. 5. Cells from upper portion of a leaf just below the teeth, × 350. 6. Underleaf, × 180. 7. Portion of a transverse section of stem, × 350. FIG. 8-9. *B. convexa* (Thunb.) Trevis. 8. Portion of plant, ventral view, to show vittate leaves and quadrifid underleaves, × 30. 9. Cell of leaf, × 400. FIG. 10-11. *B. aurescens* Spruce. 10. Underleaf, × 30. 11. Cell from the upper part of the leaf, × 400. (Drawings 1-7 from type of *B. chimantensis;* 8-9 from original collection of *B. convexa;* 10-11 from original collection of *B. aurescens.*)

as large and are quadrifid to the middle. The four long slender teeth have coarsely crenulate margins and end in a row of 2-6 cells (*fig.* 6). Such a great difference in form of the underleaves of the two certainly precludes a close relationship between them at the present time, even though the leaves have many characters in common.

This quadrifid form of the underleaf with teeth half as long as the underleaf, is also present in two of the South American species the section VITTATAE, namely, *B. convexa* (Thunb.) Trev., with an antarctic distribution and known from southern Brazil, Chile, Patagonia and the Straits of Magellan, as well as from Africa and Australia, and the somewhat similar *B. heterostipa* (Steph.) Fulford, also from southern Brazil in the vicinity of Rio de Janeiro and the state of São Paulo and perhaps farther north (Fulford, 1959-60, p. 410). But both species have small leaves with small 2-4-celled teeth, small leaf cells averaging only 16 μ with no trigones, and a well-defined vitta of larger cells, and underleaves which are hyaline nearly to the base and are divided to the middle into four teeth. The stems of *B. convexa* are mostly short and the spreading teeth of the underleaves are acute or end in a point two cells long; the cell walls are thin with only small trigones and the margins are not crenulate. The stems of *B. heterostipa* are usually long, rarely branched, and the underleaves are larger than those of *B. convexa*, with the straight to incurved teeth more likely to be variously deformed and often blunt. When all of the characters are taken into account, any comparison made with the new species would seem to indicate that any close relationship which might have existed must have been extremely ancient and that evolution has proceeded in widely divergent patterns in the two lines. Although little evidence of any sort is available, the possibility of some gene interchange between members of the section VITTATAE and/or some members of the section GRANDISTIPULAE with large leaf cells and large trigones must not be overlooked.

Insofar as studies have been made on the section GRANDISTIPULAE, CONNATAE, APPENDICULATAE, and VITTATAE, that is, on all of the American species, these sections as such appear to be good, for they represent distinct evolutionary trends or units of divergence within this large and widespread genus. They are distinct and readily separated on a number of morphologically distinct characters, although the species within any one section may be extremely variable and difficult to delimit. The distribution patterns of the sections are also distinctive and diverse and are often (apparently) restricted in scope. Such factors point to constancy

and stability of these sections over a long period of time and hence a great age for the sections and an even greater age for the genus.

Whether the same conclusions will hold for the section FISSISTIPULAE is not known, since, as pointed out earlier, until now this section has not recently been recognized in South America, and the American species which had earlier been assigned to it all belonged elsewhere. Although no recent detailed taxonomic study has been made of the Old World species now assigned to the section, on the basis of the illustrations made by Stephani in the *Icones Hepaticarum* (*Mastigobryum*, FISSISTIPULAE, nos. 340-360) and the descriptions of these species (Stephani, 1908-09), it would seem that at least some of the species from New Caledonia have a combination of characters similar to that of the new species, *B. chimantensis*.

LITERATURE CITED

FULFORD, MARGARET. 1946. The genus *Bazzania* in Central and South America. Ann. Crypt. et Phytopath. 3. Waltham, Mass.

———. 1959-60. Studies in American Hepaticae. 8-11. A supplement to "The Genus *Bazzania* in Central and South America." Bull. Torrey Bot. Club 86(5, 6): 308-341, 394-412. 113 fig.

SCHIFFNER, V. 1893-95. Lebermoose. *In* Engler & Prantl, Die natürlichen Pflanzenfamilien. Vol. 1(3), pp. 3-141. Leipzig.

STEPHANI, F. 1886. Hepaticarum species novae vel minus cognitae. V-VIII. Hedwigia 25: 5-9, pl. 2-4; 133-134, pl. 3-6; 202-208, pl. 1-3; 233-249, pl. 1-2.

———. 1908-09. Species Hepaticarum. *Mastigobryum*. 3: 413-540.

———. Icones Hepaticarum. *Mastigobryum*. nos. 1-465. Unpublished drawings made by F. Stephani. (Originals at the Conservatoire et Jardin Botaniques, Genève.)

THREE NEW SPECIES OF FISSIDENS

HOWARD CRUM[1]

Fissidens imshaugii n. sp.[2] Plants small, dull green, simple or forked, 2-3 mm. high. Leaves ± curved when dry, in 5-11 pairs, 1 mm. long, oblong, broadly or rather narrowly acute, apicu-

[1] National Museum of Canada, Ottawa.

[2] Plantae parvae, obscure virides, terricolae. Caulis erectus, simplex vel furcatus, usque ad 3 mm. altitudine. Folia in jugis 5-11, sicca subfalcata, circa 1 mm. longitudine, oblonga, acuta, apiculata; laminae duplicatae foliorum omnium per totas longitudines distincte limbatae; costa flavida, in apiculo evanida; cellulae 5-8 μ diam., inordinate hexagonae, unipapillosae. Autoicus. Seta 2-4 mm. longa, prope basem abrupte clinata, supra erecta vel plus minus flexuosa; capsula circa 0.5 mm. longa, erecta, symmetrica, subcylindrica; operculum circa 0.4 mm. longum, rostratum; dentes peristomii furcati. Sporae 10-16 μ, sphericae, laeves, virides.

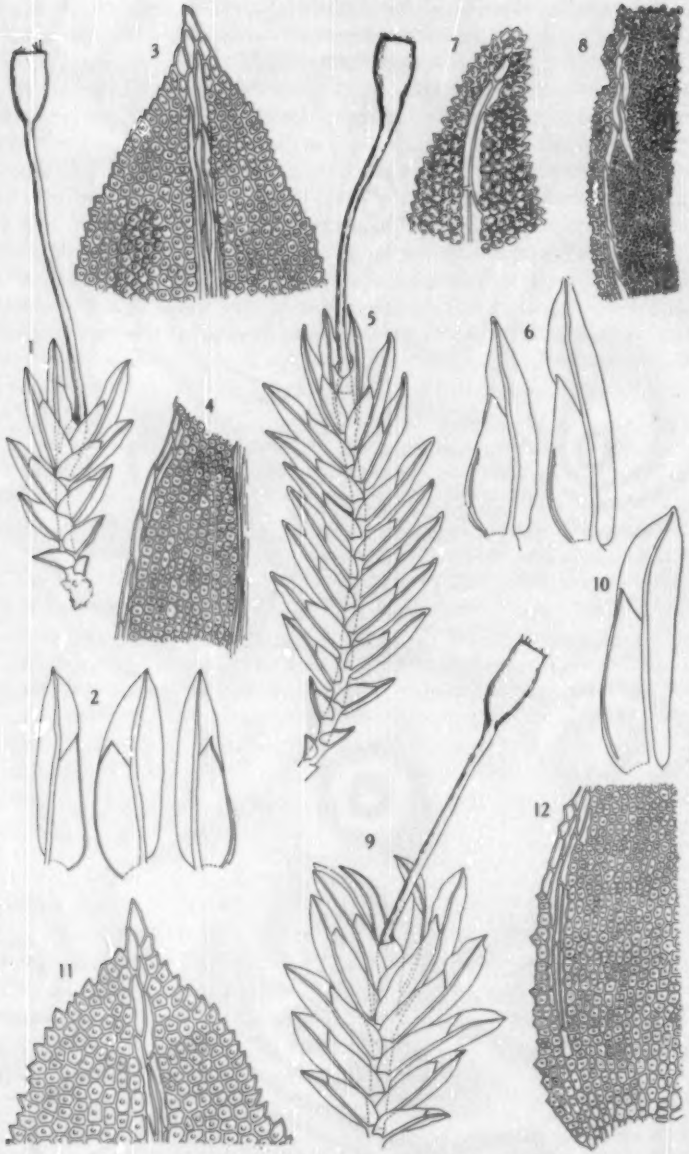


FIG. 1-4. *Fissidens imshaugii*. 1. Habit, × 21. 2. Leaves, × 42. 3. Areo-

late; margins evenly crenate-serrulate except on the vaginant laminae which are bordered their entire lengths or nearly so by 2-3 rows of yellowish, smooth, linear cells, the border often intramarginal near the base; costa yellowish and pellucid, disappearing in the concolorous apiculus; upper cells 5-8 μ, irregularly hexagonal, green, ± distinctly unipapillose. Autoicous (but often appearing dioicous); perigonial buds lateral on the main stem or terminating a short basal branch. Setae terminal, 2-4 mm. long, often sharply bent at base, otherwise straight or flexuose, yellowish becoming reddish with age; capsules 0.4-0.5 mm. long, erect and symmetric, subcylindric; operculum rostrate, about 0.4 mm. high; peristome teeth red-brown, bifid nearly to the base, spiral-ridged above, faintly papillose below. Spores 10-16 μ, spherical, smooth, green. (*Fig.* 1-4.)

CUBA: On soil, 650 ft. alt., oak-covered ridge just southwest of Hotel San Vicente, Alturas de Pizarras, Pinar del Río, *Henry A. Imshaug* 25253, Sept. 2, 1959 (type, MSC; isotype, CAN).

Though modest in appearance, *F. imshaugii* has a number of distinctive and easily observable features, such as the well-developed, yellowish border of linear cells extending nearly the length of the vaginant laminae of all the leaves (and not merely the uppermost or perichaetial), the yellowish costa disappearing in a sharp, concolorous apiculus at leaf tip, and the unipapillose leaf cells. The closest relative known to me is *F. reesei* Crum & Anderson. This species, only recently described from Florida, is clearly distinct from *F. imshaugii* in having taller stems and longer leaves, broadly acute or even obtuse leaf tips, and shorter borders on the vaginant laminae; also the costa ends below the leaf apex.

Fissidens neglectus n. sp.[3] Plants small, 3-6 mm. high, dull and sordid-green, simple or forked by innovation. Leaves in 10-17

[3] Plantae parvae, obscure brunneo-virides, saxicolae. Caulis erectus, simplex vel innovando furcatus, ad 6 mm. altitudine. Folia in jugis 10-17, sicca plus minus falcata, circa 1 mm. longa, oblongo-lanceolata, sensim acuminata, apice rotundo-obtusa; lamina dorsalis lata, basi abrupte rotunda vel truncata; laminae duplicatae foliorum plurimorum basi distincte intramarginatae; costa flava, pellucida, 3-5 cellulis sub apice evanida; cellulae hexagonae, pluripapillosae, 6-8 μ diametro. Dioicus. Setae 2-2.5 mm. longae, erectae vel flexuosa; capsulae 0.4-0.6 mm. longae, subcylindricae, erectae vel plus minus inclinatae; operculum rostratum e basi conica. Sporae 10-16 μ, sphericae, sublaeves.

lation at leaf tip, × 273. 4. Areolation in the upper part of the vaginant lamina, × 179. FIG. 5-8. *Fissidens neglectus.* 5. Habit, × 21. 6. Leaves, × 42. 7. Areolation at leaf tip, × 273. 8. Areolation at margin of vaginant lamina, × 179. FIG. 9-12. *Fissidens legalloi.* 9. Habit, × 21. 10. Leaf, × 42. 11. Areolation at leaf tip, × 273. 12. Areolation at base of vaginant lamina, × 179. *I am greatly indebted to Mrs. Mary Lou Florian for her skillful execution of the drawings.*

pairs, about 1 mm. long, somewhat falcate when dry, oblong-lanceolate, gradually tapered to a narrow, blunt or rounded tip (or in the uppermost leaves sometimes acutely pointed), most leaves, or at least the upper leaves, intramarginally bordered in the lower 1/3-2/3 of the vaginant laminae by several rows of linear, smooth, yellowish, and pellucid cells, sometimes spurred below; dorsal lamina broad, rounded or truncate at insertion; costa yellowish and pellucid, ending 3-5 cells below the apex; upper cells obscure, 6-8 μ wide, hexagonal, moderately bulging, finely pluripapillose. Apparently dioicous. Setae terminal, 2-2.5 mm. long, brownish, erect or somewhat flexuose; capsules 0.4-0.6 mm. long, erect or ± inclined, symmetric, cylindric, constricted below the mouth when dry; annulus of about 1 row of small, poorly differentiated cells; operculum about as long as the urn, rostrate from a conic base; peristome teeth brown, bifid, finely papillose below, spiral-ridged above. Spores 10-13 μ in diameter, spherical, very faintly papillose. (*Fig.* 5-8.)

CUBA: On rocks along rivulets, Lagunillas, Pinar del Río, *Charles Wright* (Second Cuban Collection no. 51), Dec. 14, 18—(FH, CAN). On rocks in mountain rivulets overflowed by heavy rain, Loma Pelada, *Charles Wright* (Third Cuban Collection no. 23), November 29, 1867 (type, FH; isotype, CAN).

This species is very closely related to *F. densiretis* Sull., also described (nearly 100 years ago) from one of Charles Wright's Cuban collections. The leaf shape, obscure areolation, and strikingly differentiated intramarginal border are very similar. The type of *F. densiretis*, however, has narrower leaves with sharp tips and conspicuously mammillose cells which lack papillae. The narrow but blunt or even rounded leaf tips and the cells which are only moderately bulging but peppered with tiny papillae will easily differentiate *F. neglectus*.

The history of Charles Wright's botanical activities in Cuba has become rather obscure. In 1861 William S. Sullivant reported on Wright's "first collection" of mosses made in 1856, 1857, and 1858 (Proc. Amer. Acad. Arts and Sci. 5: 273-290). Two other fine collections, partially named by Sullivant, with many supposed new species illustrated in pencil by August Schrader, have long been in storage at the Farlow Herbarium and were recently sent me for determination. These collections were designated by Sullivant as Wright's "Second" and "Third Cuban Collections." The date of the "third" seems to be 1867. The date of the "second" collection is given on the wrappings as "II 1859-60-62 +?"

Fissidens legalloi n. sp.[4] Small, dull green plants about 3-5 mm. high, simple or forked. Leaves in 6-12 pairs, 1-1.3 mm. long, broadly oblong, rather broadly acute, apiculate, evenly crenate-serrulate, most leaves (usually), or at least the upper, bordered 1/3-2/3 the length of the vaginant laminae by several rows of linear, smooth, hyaline cells, the border intramarginal near the base; dorsal lamina broad, tapered to the stem in lower leaves, rather abruptly narrowed at the base in upper leaves; costa disappearing in or at the base of the apiculus; cells 6-8 μ, hexagonal, firm-walled, unipapillose. Dioicous. Setae 2-4 mm. long, erect-flexuose, frequently bent abruptly at the base; capsules 0.5-0.7 mm. long, subcylindric, erect and symmetric; operculum rostrate from a conic base, about 0.5 mm. high; peristome teeth red-brown, bifid, finely papillose below, spiral-ridged above. Spores 10-13 μ, spherical, smooth or very faintly papillose. (*Fig.* 9-12.)

FRENCH ANTILLES, île Saint-Barthélemy, Guadeloupe.—À terre, morne de Petite Saline, Gris-Gris, *C. LeGallo* 674, Feb. 23, 1954, type (CAN), 1034, Feb. 13, 1956 (CAN); chemin de morne Saline, *LeGallo* 377, Oct. 11, 1951 (BARTRAM, CAN); à terre, morne de Vittet, *LeGallo* 657, Jan. 12, 1954 (CAN); sur roches, 200 m., morne de Vittet, *LeGallo* 365, Oct. 18, 1951 (BARTRAM, CAN).

This species is very similar to *F. muriculatus* Mitt. and no doubt closely related to it. The latter differs significantly, however; it has much narrower leaves which are not apiculate (although often decolorate at tip and thus giving an impression of a differentiated apiculus), its cells are more coarsely and more conspicuously unipapillose, and the borders on its vaginant laminae are shorter, completely marginal, and limited to the perichaetial leaves and a few of the uppermost leaves.

F. legalloi keys out, rather unsatisfactorily, in Grout's revision of the family (*North American Flora*, vol. 15(3), 1943) to *F. densiretis* var. *latifolius* Grout, and at one time or another, all the specimens cited above have been referred there as a temporary expedient by Mr. E. B. Bartram or myself. The var. *latifolius* has no nomenclatural status, however. Both the Puerto Rican collections which Grout cited, including the type, actually belong to *F. ravenelii* Sull. I have been unable to locate the third and

[4] Plantae parvae, obscure virides, simplices vel furcatae, ca. 3-5 mm. altae. Folia in jugis 6-12, 1-1.3 mm. longa, late oblonga, late acuta et apiculata, crenato-serrulata; laminae duplicatae plurimorum foliorum per 1/3-2/3 longitudinum marginatae, limbo prope basem intramarginato; costa in apiculo vel basi apiculi evanida; cellulae 6-8 μ diametro, hexagonae, unipapillosae. Dioicus. Seta 2-4 mm. longa; capsula 0.5-0.7 mm. longa, subcylindrica, erecta, symmetrica; operculum rostratum e basi conica; dentes peristomii bifurcati. Sporae 10-13 μ diametro, sphericae, sublaeves.

final specimen cited by Grout (Guadeloupe, *Marie* 114), but the coincidence of geographic origin suggests that it can be referred to *F. legalloi*. *F. densiretis* scarcely resembles *F. legalloi*, and the relationship is too remote to warrant detailed discussion here. Among other differences, its leaves are narrow and long-tapering, obscurely areolate because of rather grossly mammillose cells, and more strikingly bordered, with the border much more obviously intramarginal.

FISSIDENS FLAVOSETUS, A NEW SPECIES FROM HAITI [1, 2]

RONALD A. PURSELL[3]

During the course of a revision of *Fissidens* Hedw., section BRYOIDIUM C. M. in North America, two collections examined from Haiti were not similar to any known species from the area. The specimens originally had been referred to the widespread and polymorphous *F. bryoides* Hedw. and were recently reported as such by Crum and Steere (1958). For these plants I now propose the following name, and refer them to the section HETEROCAULON C.M.

Fissidens flavosetus sp. nov.[4] *Plants caespitose, small, yellow-green.* Sterile stems reddish near base, erect or occasionally decumbent, unbranched, 2-5 mm. long, with as many as 15 pairs of

[1] This work represents a revision of part of a doctoral dissertation completed in the Dept. of Biological Sciences, Florida State University, Tallahassee. I wish to thank Dr. Lynette Thompson, Florida State University, for assistance with the Latin diagnosis.

[2] Contribution from Dept. of Biological Sciences, Florida State University, and from the Botanical Laboratory, The University of Tennessee, N. Ser. 193.

[3] The Pennsylvania State University, School of Forestry, Mont Alto Branch, Mont Alto, Pennsylvania.

[4] Plantae caespites, humiles, flavo-virides, dimorphes, simplex. Caulis sterilis erectus vel decumbens, 2-5 mm. altitudine, caulis fertilis ca. 1 mm. altitudine. Folia angusta, lanceolata, acuminata, 1.4 mm. longitudine, 0.2 mm. latitudine, usque ad 15-juga, superiora imbricata, inferiora distantia, vel omnia imbricata, ubique limbata; folia perichaetalia angustiora; limbus crassus, bistratosus, apicem folii attingens; costa crassa, in mucronem excurrens; costa folii perichaetalis longius excurrens; cellulae superiores irregulariter sexangulae, (8-)10-13(-16.5) μ longitudine, (5-)6.5(-8) μ latitudine, elongatae, leves. Rhizo-autoicus, antheridiis gemmiformis sub femineis et sterilibus caulibus, archegoniis terminalibus. Seta 7.5-12.0 mm. longitudine, flexuosa, valde flava; theca 0.7-0.8 mm. longa, flava, librata, inaequalis; dentes peristomii profunde bifidi, rubri; semina minute papillosa, 10-16 μ in diametro. Operculum et calyptra deseunt.

leaves; some cortical cells enlarged and inflated. Fertile stems also reddish at base, shorter, ca. 1 mm. long, erect, with 3-4 pairs of leaves. Leaves shrunken and variously contorted when dry, some tightly crispate, largest near the top of the stem, narrow-lanceolate, acuminate, entire, up to 1.4 mm. long and 0.2 mm. wide, somewhat narrower in the perichaetium, distant below, becoming imbricate above, or sometimes imbricate all the way to the base. Costa flexuous, stout, 16-23 μ wide at the junction of the vaginant and apical laminae, narrowing very gradually to the apex, *excurrent into a mucronate point, longer-excurrent in the perichaetial leaves,* terete in cross-section with two guide cells in the region of the apical and dorsal laminae, 2-3 guide cells in the region of the vaginant lamina. *Limbidium strong, bistratose,* 2-3 cells wide on the apical and dorsal laminae, 3-4 cells wide on the vaginant lamina, *confluent with the costa,* extending all the way to the base of the dorsal lamina. *Cells of the upper part of the leaf irregularly hexagonal,* mostly elongate, (8-)10-13(-16.5) μ long, (5-)6.5(-8) μ wide, not densely chlorophyllose, smooth or slightly bulging, isodiametric in cross-section. Cells of the vaginant lamina becoming more regularly quadrate to rectangular, with a few basal ones near the costa larger, 16-24 μ long, and ca. 10 μ wide. Vaginant lamina 1/2-2/3 the length of the leaf, the two parts mostly equal at their union in almost all leaves except those of the perichaetium. Dorsal lamina narrowing to the insertion, ending in a few enlarged quadrate to polygonal cells, often slightly decurrent. Rhizo-autoicous; antheridial stems gemmiform, at the base of the sterile and archegonial stems; archegonial stems also attached to the sterile stems by rhizoids. *Seta long, 7.5-12.0 mm., erect, bright yellow. Theca yellow,* shrunken beneath the rim when dry, 0.7-0.8 mm. long, with a distinct neck, horizontal or nearly so, asymmetric; exothecial cells collenchymatous, mostly quadrate or rectangular, decreasing in size near the rim, in cross-section isodiametric, smooth, with the inner wall thickest. Peristome of 16 teeth, dark red at base, lighter above, deeply forked, the divisions spirally thickened. Spores minutely papillose, 10-16 μ in diameter. Operculum and calyptra not seen.

On decaying wood and soil. *Haiti:* SHADA area, Mornes des Commissaires, March 19, 1944, *Mackaness* 138, TYPE, as *F. bryoides* Hedw., mixed with *F. repandus* and *F. taxifolius* (MICH); Guimbi Galata, Mornes des Commissaires, 1700-1800 m., Dec. 16, 1945, *Holdridge* 3121a, *paratype,* as *F. bryoides* (FH, MICH).

Fissidens flavosetus is the first species of the section HETEROCAULON reported from any land mass in the Caribbean. It is readily distinguishable by its dimorphic stems, strong costa confluent with

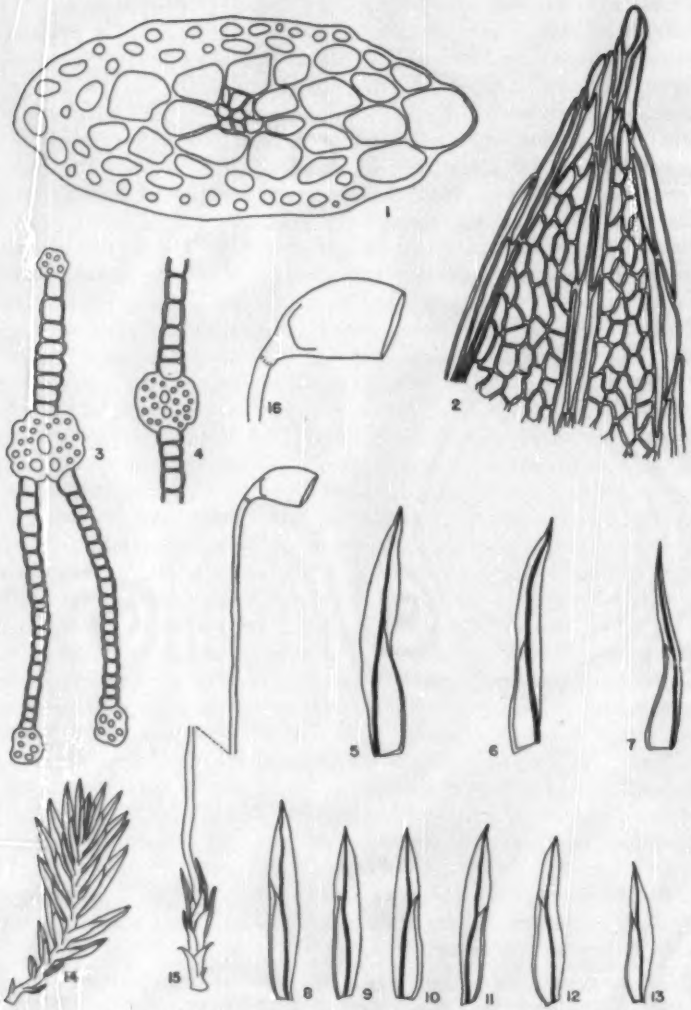


FIG. 1-16. *Fissidens flavosetus.* 1. Cross-section of fertile stem. 2. Tip of leaf from sterile stem. 3. Cross-section of lower part of leaf from sterile stem. 4. Cross-section of upper part of leaf from sterile stem. 5-7. Perichaetial leaves. 8-13. Leaves from sterile stem. 14. Habit sketch of sterile stem. 15. Habit sketch of fertile stem. 16. Theca (peristome not shown). (Fig. 1-6, 8-14 from type; fig. 7, 15, 16 from *paratype;* figs. 1-4, × 270; 5-13 and 16, ca. × 25; 14-15, ca. × 15).

the stout limbidium, long bright-yellow seta, and horizontal, asymmetric capsule. Among its congeners it seems most closely related to *F. milobakeri* Koch (1951) from California, differing essentially in the imbricate and larger leaves of the sterile stems, of which the dorsal laminae either cease at the insertion or are slightly decurrent, the shorter fertile stems, the occasional enlarged cortical cells, and larger leaf cells. In *F. milobakeri* the seta also tends to be somewhat darker. *Fissidens bockii* and *F. incisus*, both described by Herzog (1916) from specimens collected in the Bolivian Cordillera differ essentially in having shorter setae, erect capsules, and limbidia that cease below the leaf-apex.

Müller (1901) characterized the section HETEROCAULON as follows: (1) dimorphic stems; (2) dorsal lamina absent or only weakly developed on leaves of both types of stems; (3) leaves of the sterile stem oval-rhomboidal; (4) leaves of the fertile stem larger; (5) limbidium restricted mostly to the vaginant lamina; (6) costa very thin and excurrent; and (7) leaf cells roundish. Whether the complex of species mentioned really belongs in *Heterocaulon* cannot be settled until it and related sections have been critically reviewed. The presence of a strong limbidium bordering the entire leaf certainly suggests the section BRYOIDIUM, but the elongate, nearly rectangular cells, and the exceedingly long and flexuous yellow setae, particularly of *F. flavosetus* and *F. milobakeri*, distinguish them known species of either section. It seems best, at present, to maintain them in HETEROCAULON.

LITERATURE CITED

CRUM, H. & W. C. STEERE. 1958. A contribution to the bryology of Haiti. Amer. Midl. Nat. 60(1): 1-51.

HERZOG, T. 1916. Die Bryophyten meiner zweiten Reise durch Bolivia. Bibl. Bot. 87: 1-347. 8 pl.

KOCH, L. F. 1951. Mosses of California. IV. *Fissidens milobakeri* sp. nov. The Bryologist 54: 204-207.

MÜLLER, C. 1901. Genera Muscorum Frondosorum. 474 pp. Leipzig.

MOSSES OF GUAM, MARIANA ISLANDS

EDWIN B. BARTRAM[1]

As Guam has become an important stopover in air travel to the Southwest Pacific, the transient and permanent population will now and then include someone with an interest in the plant life of

[1] Bushkill, Pike Co., Pa.

this small but only American-owned land near the Indo-Malayan regions. Records of moss collections have been few, the only ones I know of being by Dixon (1943) and the writer (1945).

Recently a small collection of Guam mosses made by Woodrow Wayne Holland received from the University of California through the kindness of Miss Isabelle Tavares suggested that it might be worthwhile to prepare a list of all the known records. While probably far from complete, it will at least be a basis to work from as further collections become available.

In the interest of brevity the principal localities represented in Holland's collections are noted in the list by the following symbols: "A"—Limestone forest about 6 mi. N. of Agana, 2 mi. inland from the west coast. "B"—S. of Ritidian Point. "C"—N. end of Tumon Bay.

Fissidentaceae

Fissidens braunii (C.M.) Dozy & Molk., form. "B," on rocks, ca. 200 ft., *Holland* 6. These plants differ from typical *F. braunii* in their smaller size and shorter, more bluntly pointed leaves but scarcely represent anything more than a form of the species.

Leucobryaceae

Leucophanes subglaucescens C. M. Above Uruno Point, *Reid Moran* 4516; *s.l., P. Nelson* 446.

Leucophanes smaragdinum (Mitt.) Par. "A," *Holland* 25. "B," *Holland* 9. Machanao Dist., *E. H. Bryan, Jr.*, 1192. Harmon Field, *Joe Herbst* G6, *Alfred Clebsch, Jr.*, G1.

Calymperaceae

Syrrhopodon revolutus Dozy & Molk. N. of Telefofo River, *R. J. Rodin* 697.

Thyridium fasciculatum (Hook. & Grev.) Mitt. "A," *Holland* 20. Harmon Field, *Joe Herbst* G7.

Calymperes semperi Besch. Harmon Field, *Alfred Clebsch, Jr.*, G3. Here the cancellinae are scalariform, the teniolae about 4 rows in from the leaf shoulders, and the margins of the blade narrowly thickened and denticulate. The plants probably represent a poorly developed form of *C. semperi* previously known only from the Philippines.

Calymperes moluccense Schwaegr. Mt. Tenjo, *A. Clebsch, Jr.*, G12. Tumon Bay, *A. Clebsch, Jr.*, 15, 13.

Calymperes hyophilaceum C. M. Mt. Tenjo, *Holland* 14. "A," *Holland* 21, 53. Tumon Bay, *A. Clebsch, Jr.*, 14.

Calymperes tahitense (Sull.) Mitt. N. of Almagosa, *E. H. Bryan, Jr.*, 1228 in part.

POTTIACEAE

Hyophila involuta (Hook.) Jaeg. "C," *Holland* 74. "A," *Holland* 32.

Weisiopsis hollandii sp. nov. Autoica; gregarie crescens, viridis. Caulis brevissimus, dense foliosus. Folia sicca arcte crispata, humida erecto-patentia, anguste lingulata, rotundato-obtusa, ad 2 mm. longa, 0.4 mm. lata; marginibus erectis, crenulatis; costa infra apicem folii evanida; cellulis basilaribus oblongis, hyalinis, teneris, ad 16 μ latis, laminalibus rotundatis, diam. 10-16 μ, mammillosis, chlorophyllosis. Seta 7-9 mm. longa, tenuissima, rubra; theca erecta, oblongo-cylindrica, fusca, 1.5 mm. longa; operculum longe rostratum; dentes peristomii erecti, fere ad basin divisi; sporae pallidae, laevissimae, diam. 8-10 μ.

Limestone forest about 6 mi. N. of Agana, 2 mi. inland from W. coast, on rock 5 in. in diameter, *W. W. Holland* 61, Nov. 17, 1945.

A unique species characterized by the narrow, lingulate leaves, crenulate margins, and the large, chlorophyllose, convex lamina cells.

Barbula indica (Schwaegr.) Brid. "C," *Holland* 71. Near Sigua River, *R. J. Rodin* 652, *P. Nelson* 445.

Barbula obscuriretis Dix. 1/4 mi. above Agana, among grasses, *Holland* 18.

BRYACEAE

Brachymenium indicum (Dozy & Molk.) Bry. jav.?, sterile. "C," *Holland* 77.

Bryum coronatum Schwaegr. 1 mi. N. of Dededo, *Holland* 82. Mt. Tenjo, *Holland* 13.

Bryum capillare Hedw. "A," *Holland* 35a in part.

BARTRAMIACEAE

Philonotis asperifolia Mitt.? Tributary of Sigua River, on wet rocks, *R. J. Rodin* 743. This collection is sterile and can only tentatively be referred here.

ORTHOTRICHACEAE

Macromitrium semipellucidum Dozy & Molk. Harmon Field, *A. Clebsch, Jr.*, G2. "A," *Holland* 28. Mt. Tenjo, *Holland* 17.

RHACOPILACEAE

Rhacopilum cuspidigerum (Schwaegr.) Mitt. "A," *Holland* 43, 46a. "C," *Holland* 72, 73.

Rhacopilum pacificum Besch. Guam, *s.l., R. C. McGregor* 628 (Herb. U. S. Nat. Mus.).

METEORIACEAE

Papillaria intricata (Mitt.) C. M. Machanao Dist., *E. H. Bryan, Jr.*, 1186b, 1189, 1193a.

Floribundaria floribunda (Dozy & Molk.) Fleisch. "A," *Holland* 63, 64.

HOOKERIACEAE

Chaetomitrium weberi Broth. "A," *Holland* 27. Previously known only as a Philippine endemic.

LESKEACEAE

Pelekium velatum Mitt. "A," *Holland* 39.

Thuidium plumulosum (Dozy & Molk.) Bry. jav. "B," *Holland* 2, 7, 10 in part. Anderson Air Force Base, *Reid Moran* 4651.

SEMATOPHYLLACEAE

Meiothecium microcarpum (Harv.) Mitt. "A," *Holland* 60.

Sematophyllum parvifolium sp. nov. Caespitosum, caespitibus densis, depressis, lutescentibus, nitidis. Caulis 2-3 cm. longus, repens, irregulariter pinnatim ramosus, ramis brevibus. Folia sicca parce homomalla, humida latissime patentia, oblongo-ovata, breviter acuminata, integerrima, vix 1 mm. longa, 0.5 mm. lata, ecostata; cellulis linearibus, 4-5 μ latis, 40-50 μ longis, infimis abbreviatis, alaribus 3-4, oblongis, hyalinis, omnibus laevissimis. Caetera ignota.

Limestone forest about 6 mi. N. of Agana, 2 mi. inland from W. coast, 5-10 ft. up on trunk of *Pandanus*, *W. W. Holland* 52 (type), 47, Nov. 17, 1945.

Similar to *S. tristiculum* (Mitt.) Fleisch. but more slender with smaller leaves and narrower lamina cells.

Taxithelium instratum (Brid.) Broth. "B," *Holland* 5. Above Uruno Point, *Reid Moran* 6510.

Taxithelium lindbergii (Bry. jav.) Ren. & Card. "A," *Holland* 44.

HYPNACEAE

Ectropothecium incubans var. *scaberulum* (Broth.) Fleisch. N. of Almagosa, *E. H. Bryan, Jr.*, 1228 in part.

Ectropothecium dealbatum (Hornsch. & Reinw.) Jaeg. "A," *Holland* 31, 34, 35, 40, 49, 54, 56, 68, 69, 70. "C," *Holland* 51, 75, 78, 79. "B," *Holland* 1, 8, 11, 12. Guam, *s.l.*, *R. C. McGregor* 628 in part.

Ectropothecium monumentorum (Duby) Jaeg. Harmon Field, *Joe Herbst* G8. "A," *Holland* 58. If the shorter seta is a valid diagnostic character, this species is decidedly less common than *E. dealbatum*.

Isopterygium minutirameum (C. M.) Jaeg. "A," *Holland* 48. "C," *Holland* 80.

Vesicularia perangusta Dix. Guam, *s.l., Peter Nelson* 445b (Herb. Bur. Sci. Manilla).

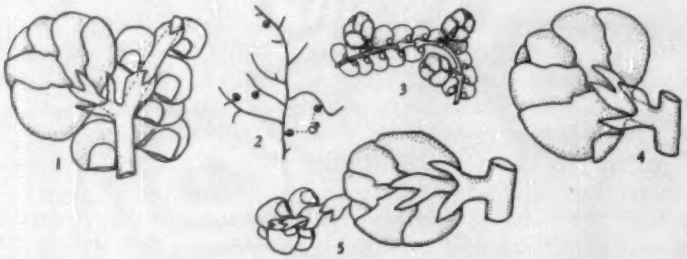
LITERATURE CITED

BARTRAM, E. B. 1945. Pacific outpost mosses. The Bryologist 48: 45-53.
DIXON, H. N. 1943. War zone mosses. The Bryologist 46: 14-22.

FRULLANIACEAE OF BURMA. V. TWO SPECIES OF FRULLANIA NEW TO BURMA

RUTH D. SVIHLA[1]

FRULLANIA TAMSUINA Steph. This species was first described by Stephani (Sp. Hep. 4: 444. 1910) from sterile specimens. He designated its range as Formosa and eastern China. Hattori [Jour. Jap. Bot. 20(3): 157. Fig. 36. 1944] described the female plant from Tamsui, Formosa, and added the Ryukyus (islands between Formosa and Japan) to the range. He stated that the male was unknown. In 1952 and 1953 both male and female plants were found in Burma thus extending the range far to the south and west. Since Hattori has described and figured the female plant so adequately, my description and illustrations are limited to the male plant (figs. 1-5).



FRULLANIA TAMSUINA, male plant. 1. Part of male plant, × 35. 2. Scheme of branching. 3. Male plant, × 13. 4. Male inflorescence, × 35. 5. Male inflorescence showing vegetative growth at tip, × 35. (All drawn by Svihla from number 1105a except figure 3 which was drawn from number 1074a.)

Male inflorescence subglobose, a short branch sometimes continuing vegetatively; first underleaf bilobed with widely divergent

[1] Dept. of Botany, University of Washington, Seattle 5, Wash.

lobes; bracts 2-4 pairs, nearly equally bilobed; apices rounded, margins entire except for a short tooth on the ventral margin; bracteoles oblong, 1/2 or more bifid, lobes acute to acuminate toward the apices, margins entire.

RANGE: Formosa, Ryukyu, eastern China, Burma.

HABITAT: On trees, intermingled with mosses and hepatics, particularly with other species of *Frullania*.

SPECIMENS EXAMINED: All collected from the Shan States of Burma by Svihla in 1952 unless otherwise stated. *Maymyo*, roadside ne. of American Baptist Mission Rest House, about 3500 ft., 1031b, 1036b, June 29; 1067b, 1069b, 1073b, July 10; Circular Road, 1105a, Aug. 9; 1132, Aug. 14. *Lashio*, 10 mi. along road to Namtu, about 2500 ft., 1074a, 1075a, July 11. *Maymyo-Lashio* Road, 55 mile marker, 1148b, Aug. 16. *Taunggyi*, along trail to Crag, 4500 ft., 1240b, Sept. 19; 1477, Mar. 30, 1953. Along trail to North Pagoda, 1506, Apr. 3, 1953. *Kalaw*, 1625, 1627b, 1628b, Apr. 27, 1953.

Some specimens, especially numbers 1148b, 1625, and 1628b, have many flagellae and innovations while others have few to none. Neither Stephani or Hattori mentioned this in their descriptions. *Frullania bolanderi* Aust. is characterized by its upright flagelliform branches and is reported from Sakhalin Island (Evans, The Bryologist 18: 88. 1915). These two species are evidently similar in some characters, but our specimens differ from *F. bolanderi* in having larger leaves and underleaves, ventral lobes farther from the stem, and female bracteoles more deeply bifid and not united with the bracts or only so at the very base.

Dr. Hattori kindly checked the identification of number 1036b with which I compared the other specimens.

FRULLANIA MEYENIANA Lindenb. This species was first described by Lindenberg (Syn. Hep. 455. 1845) from Oahu, Hawaii. Evans (Trans. Conn. Acad. 10: 402. Pl. 45, Figs. 8-14. 1900) also described it from Hawaii and figured it as well. He listed as synonyms *F. kunzei* Aust. and *F. helleri* Steph. Verdoorn (Ann. Bryol. Suppl. 1: 81. Fig. 58. 1930) described and figured it from Java and the Philippines, giving as synonyms *F. helleri* Steph., *F. pallens* Steph. and *F. accumbens* Steph. He stated that *F. kunzei* according to Evans also belonged here. Hattori (Bull. Tokyo Sci. Mus. 11: 146. Figs. 91, 92. 1944) described it in Latin and figured it fully. He gave *F. kunzei* and *F. helleri* as synonyms. Since it has been described and figured so extensively, I merely wish to point out here that finding this species in southern Burma extends its known range considerably westward. Since this part of Burma, as indeed the entire Malayan Peninsula, is practically unknown bryologically, it is to be expected that many species related to or

identical with those known from Java and the Philippines will be found here.

RANGE: Hawaiian Islands, Philippines, Java, Burma.
HABITAT: On trees with other bryophytes.
SPECIMEN EXAMINED: Southern Burma, Pahtaw Island opposite Mergui, on rubber trees in old rubber plantation, *Svihla* 1372, Mar. 11, 1953.

LICHENS NEW TO THE STATE OF WASHINGTON

WALTER J. EYERDAM[1]

Recent publications by Dr. Grace E. Howard have kept our knowledge of Washington lichens nearly up to date, but I have found in my own herbarium 70 lichens, including 42 species, two subspecies, nine varieties, and 17 forms, apparently not previously reported from the state. A number of these (*Alectoria cana, Buellia disciformis, Lecanora melaena, Parmelia fuliginosa,* and *P. laciniatula*) could not be found in Hale and Culberson's checklist (1956), but whether they are new to North America or only buried in synonymy is not readily apparent.

Nearly all the specimens cited below were collected by myself. Only one collection is cited in each case, although many of the lichens were found in two or more localities. All the specimens were named by Dr. A. W. Herre or by Dr. John W. Thomson, Jr.

Acarospora americana Magn. On igneous rocks on shore of Moses Lake, Grant Co., Feb. 28, 1953 (1630, det. Herre).

Alectoria cana (Ach.) Leight. On red alder (*Sambucus*), Twin Rivers, Clallam Co., March 24, 1959 (1904, det. Herre).

Buellia disciformis var. *saxicola* Oliv. On petrified wood, Rattlesnake Hills, Yakima Co., Sept. 21, 1952 (1652, det. Herre).

Catillaria franciscana (Tuck.) Herre. On schist-sandstone rock on beach, Copalis Beach, Grays Harbor Co., March 14, 1948 (1519, det. Thomson).

Cladonia bellidiflora fo. *coccocephala* (Ach.) Vain. Growing with the following (1006b). Fo. *hookeri* (Turk.) Nyl. On decayed spruce, Mt. Pilchuck, Snohomish Co. (1066a, det. Thomson).

Cladonia capitata fo. *microcarpa* Evans. On hemlock, Heather Lake Trail, Mt. Pilchuck, Snohomish Co., *Earl Larrison* (1073, det. Thomson).

Cladonia chlorophaea fo. *simplex* (Hoffm.) Arn. On end of decayed fir log, Mt. Pilchuck, Snohomish Co. (1125).

Cladonia coniocraea fo. *ceratodes* (Flk.) Dalla Torre. On hemlock, elev. 1800 ft., Mt. Pilchuck, Snohomish Co., *Earl Larrison* (1068, det. Thomson). Fo. *finkii* (Vain.) Evans. On hemlock wood, elev. 950 ft., Verlot Camp, Mt. Pilchuck, Snohomish Co., *Earl Larrison* (1080, det. Thomson). Fo. *truncata*

[1] 7531 19th Ave. N.E., Seattle 15, Wash.

Dalla Torre & Sarnth. In moss, Mt. Pilchuck, Snohomish Co., Apr. 8, 1948 (1127, det. Thomson).

Cladonia cornuta (L.) Schaer. On the ground, Gold Basin, Mt. Pilchuck, Snohomish Co., March 30, 1948 (1118, det. Thomson).

Cladonia cornutoradiata (Coem.) Vain. On charred stump, 4 mi. E. of Arlington, Snohomish Co., Oct. 22, 1949 (1090, det. Thomson).

Cladonia degenerans fo. *phyllophora* (Ehrh.) Flot. On hemlock bark, Gold Basin, Mt. Pilchuck, Snohomish Co. (1079, det. Thomson).

Cladonia floerkeana (Fr.) Flk. On hemlock (*Tsuga heterophylla*), Verlot Camp, Mt. Pilchuck, Snohomish Co., *Earl Larrison*, Dec. 3, 1947 (1081, det. Thomson).

Cladonia furcata var. *racemosa* (Hoffm.) Flk. On decaying log, Heather Lake Trail, Mt. Pilchuck, Snohomish Co., Nov. 29, 1947 (1072, det. Thomson).

Cladonia gracilis var. *dilatata* (Hoffm.) Vain. On humus, Heather Lake Trail, Snohomish Co., Nov. 29, 1947 (1075, det. Thomson).

Cladonia lepidota var. *stricta* fo. *pterophora* Vain. On hemlock log, Heather Lake Trail, Snohomish Co. (1074, det. Thomson).

Cladonia macilenta fo. *granulosa* Aigr. On charred Douglas Fir stump, Mt. Pilchuck, Snohomish Co., Dec. 21, 1947 (1083, det. Thomson). Fo. *stryracella* (Ach.) Vain. On decaying log, Mt. Pilchuck, Snohomish Co. (1064, det. Thomson).

Cladonia multiformis fo. *subascypha* (Vain.) Evans. In moss on rotten fir log, E. side of Whidby I., Island Co., Aug. 5, 1941 (1521, det. Thomson).

Cladonia ochrochlora Flk. On old log, elev. 150 ft., Ten Mile Township, Whatcom Co. (1617, det. Herre).

Cladonia pityrea fo. *cornuta* Tors. On hemlock bark, Gold Basin, Mt. Pilchuck, Snohomish Co., Dec. 1, 1947 (1078, det. Thomson). Fo. *squamulifera* Vain. On alder bark, elev. 1100 ft., Gold Basin, Mt. Pilchuck, Snohomish Co., *Earl Larrison*, Dec. 1, 1947 (1077b, det. Thomson). Fo. *zwackhii* Vain. On alder bark, elev. 1100 ft., Gold Basin, Mt. Pilchuck, Snohomish Co., *Earl Larrison*, Dec. 1, 1947 (1077a, det. Thomson).

Cladonia pyxidata var. *neglecta* (Flk.) Mass. On hemlock, Heather Lake Trail, Mt. Pilchuck, Snohomish Co., Nov. 29, 1947 (1069, det. Thomson).

Cladonia scabriuscula fo. *surrecta* (Flk.) Vain. On decaying fir log, Red Mountain, King Co., Aug. 15, 1942 (1566, det. Thomson).

Cladonia turgida (Ehrh.) Hoffm. Amongst moss on forest debris, Solduck R., Solduck Hot Springs District, Olympic National Park, Clallam Co., Aug. 11, 1944 (1546, det. Thomson).

Coniocybe furfuracea (L.) Ach. On rough bark at base of *Acer macrophyllum*, Dungeness, Clallam Co., March 3, 1957 (1744, det. Herre).

Lecanora cinerea var. *microspora* Fink. On basalt, Fort Simcoe, Yakima Indian Reservation, Yakima Co., Apr. 7, 1948 (1579, det. Herre).

Lecanora conizaea (Ach.) Nyl. On cedar fence posts, Bungeness, Clallam Co., March 3, 1957 (1747, det. Herre).

Lecanora contorta (Hoffm.) Stein. On siliceous rock, Restoration Point, Bainbridge I., Kitsap Co., March 16, 1957 (1770, det. Herre).

Lecanora diffracta Ach. On lava rocks, Rattlesnake Hills, Yakima Co., Sept. 21, 1952 (1618, det. Herre).

Lecanora melaena (Hedl.) Fink. On a large rock, Mount Rainier, near Chinook Pass, July 13, 1957 (1838, det. Herre).

Lecidea cascadensis Magn. On basalt, Rattlesnake Hills, Yakima Indian Reservation, Yakima Co., April 7, 1948 (1590, det. Thomson).

Lecidea coarctica (Sm.) Nyl. On quartzite schist, Mt. Pilchuck road, Snohomish Co., July 4, 1954 (1192, det. Thomson).

Lecidea platycarpa Ach. On bark of Douglas Fir sapling, Skykomish, Snohomish Co., June 22, 1957 (1828, det. Herre).

Nephromopsis californica Gyel. On dead fir twigs, Pine Lake, King Co., July 20, 1941 (1630, det. Thomson).

Ochrolechia oregonensis Magn. On hemlock, Gold Basin, Mt. Pilchuck, Snohomish Co., March 30, 1948 (1035, det. Herre).

Parmelia cetrarioides Del. On alder bark, Gold Basin, Mt. Pilchuck, Snohomish Co., March 30, 1959 (1103, det. Herre).

Parmelia disjuncta Erichs. On basalt, Rattlesnake Hills, Yakima Co., April 7, 1948 (1591a, det. Herre).

Parmelia exasperata (Ach.) DeNot. On grandodiorite boulder, Restoration Point, Bainbridge I., Kitsap Co., March 16, 1957 (1786, det. Herre).

Parmelia fuliginosa (Fr.) Nyl. On *Salix scouleriana*, 4 mi. E. of Arlington, Snohomish Co., Oct. 22, 1949 (1182, det. Herre).

Parmelia laciniatula (Flagey) Zahl. On twigs of *Prunus emarginata* on seashore, Twin Rivers, Clallam Co., May 28, 1956 (1680, det. Herre).

Peltigera aphthosa var. *variolosa* (Mass.) Thoms. On spruce wood, Mt. Pilchuck, Snohomish Co. (1009, det. Thomson).

Peltigera canina fo. *leucorrhiza* Flk. In sand dune under bushes, Copalis Beach, Grays Harbor Co., March 14, 1948 (1014, det. Thomson).

Pertusaria pocillum Cumm. On bark of young Douglas Fir, Skykomish, Snohomish Co., June 22, 1957 (1826, det. Herre).

Physcia tenella (Scop.) Bitt. On gravestones, Mount Pleasant Cemetery, Queen Anne Hill, Seattle, King Co., Feb. 27, 1957 (1720, det. Thomson).

Pilophoron aciculare (Ach.) Nyl. Under overhanging rock in road cut, Gold Basin, Mt. Pilchuck, Snohomish Co., March 30, 1948 (1091, det. Herre).

Ramalina leptocarpha var. *sorediata* Tuck. On old apple trees of Old Gries Ranch, Cowlitz R., Lewis Co., Aug. 18, 1958 (1885, det. Herre).

Rinodina novomexicana B. de Lesd. On hornblende schist, near Vantage, Kittitas Co., April 27, 1957 (1801, det. Herre).

Sarcogyne bicolor Magn. On quartzite schist, Mt. Pilchuck road, Snohomish Co., July 4, 1954 (1193, det. Herre).

Sphaerophorus fragilis (L.) Pers. On hemlock, Gold Basin, Mt. Pilchuck, Snohomish Co., *Earl Larrison*, Dec. 3, 1947 (1027, det. Thomson).

Usnea capillaris Mot. On *Picea sitchensis*, Tokeland, Pacific Co., July 27, 1957 (1877, det. Herre).

Usnea comosa (Ach.) Röhl. On dead alder branches, Port Angeles, Clallam Co., May 6, 1956 (1673, det. Herre). Ssp. *similis* Mot. On *Acer macrophyllum* (maple), Old Gries Ranch, Lewis Co. (1886, det. Herre).

Usnea compacta Mot. On *Abies nobilis*, top of Hurricane Ridge, Olympic Mts., Clallam Co., June 8, 1958 (1904, det. Herre).

Usnea dasypoga var. *emena* Mot. On *Alnus oregana* branches, McCord Field, South Tacoma, Pierce Co., April 27, 1947 (1532, det. Thomson).

Usnea glabrata (Ach.) Vain. On cedar fence posts, Tokeland, Pacific Co., July 27, 1957 (1868, det. Herre).

Usnea glabrescens (Nyl.) Vain. On hemlock twigs, Raging River, King Co., July 4, 1957 (1885, det. Herre). Ssp. *glabella* Mot. On hemlock, Gold Basin, Mt. Pilchuck, Snohomish Co., *Earl Larrison*, Dec. 3, 1947 (1050, det. Thomson).

Usnea mollis Stirt. On cedar fence posts, Tokeland, Pacific Co., July 27, 1927 (1878, det. Herre).

Usnea sorediifera Mot. On old plum trees, Old Gries Ranch, back of Cowlitz R., Lewis Co., Aug. 18, 1958 (1894, det. Herre).

Usnea stuppea (Rās.) Mot. On hazel bushes (*Corylus rostrata*), Sea Crest Camping Ground, Cowlitz Co., Aug. 18, 1957 (1900, det. Herre).

Usnea trichodea (Ach.) Mot. On Douglas Fir branches, Gold Basin, Mt. Pilchuck, Snohomish Co., March 30, 1948 (1101, det. Thomson).

Verrucaria hydrela Ach. In road cut on schist, Gold Basin, Mt. Pilchuck, Snohomish Co., March 30, 1948 (1087, det. Thomson).

Verrucaria mucosa Wg. On hard, massive, fine-grained, black, siliceous shale in stream bed, Olympic Hot Springs, Clallam Co. (1902).

Xanthoria candelaria var. *leprosa* Hillm. On old bricks, Fort Simcoe, Yakima Indian Reservation, Yakima Co., April 7, 1948 (1583).

Xanthoria fallax (Hepp.) Arn. On oak (*Quercus garryana*), Fort Simcoe, Yakima Indian Reservation, Yakima Co., April 7, 1948 (1580, det. Thomson).

LITERATURE CITED

HALE, M. E., JR. & W. L. CULBERSON. 1956. A checklist of the lichens of the United States, Canada and Alaska. Castanea 21: 73-105. 1956.

HOWARD, GRACE E. 1950. Lichens of the State of Washington. 191 pp. Frontisp.; pl. 1-11. Seattle.

———. 1955. Lichens of northwest America collected by W. N. Suksdorf. The Bryologist 58: 49-64.

BRYOPHYTES OF SOUTHWEST MISSOURI. III. ADDITIONS TO THE FLORA

PAUL L. REDFEARN, JR.[1]

In the course of field and herbarium studies during the past year a number of species have been encountered which appear to be new state records or verifications of earlier records for which distributional data are lacking. Voucher specimens for the collections listed below have been deposited, whenever possible, with the herbaria cited with each collection number (abbreviations as listed in the "Index Herbariorum"). I should like to express my thanks to Dr. David B. Dunn for the loan of the University of Missouri's holdings of bryophytes and to the various authorities who have examined or determined many of the following collections.

Riccia crystallina L. On calcareous mud and wet soil, Shannon Co., *E. B. Drew* 63, 77 (UMO).

Lophocolea minor Nees. Moist shaded soil along creek bank, Texas Co., 5496.

Nowellia curvifolia (Dicks.) Mitt. On rotten log at base of cliff, Shannon Co., *E. B. Drew* 51 (UMO).

[1] Dept. of Science, Southwest Missouri State College, Springfield, Mo. This paper is based on field work supported by a Sigma Xi RESA Research Grant and by National Science Foundation Grant G-9059.

Dicranum rugosum Brid. Very abundant on shaded soil of oak-cedar ridge, *ca.* ½ mi. E. of Roaring River State Park on County Road F, Barry Co., 5640 (DUKE, FSU, TENN, US).

Trichostomum jamaicense (Mitt.) Jaeg. On shallow soil of limestone crevices, McDonald, 5389 (DUKE, det. by L. E. Anderson), Stone, 5439, and Texas, 5503, Counties.

Barbula convoluta Hedw. On shaded soil, Dent, 5152 (det. by H. Crum), and Texas, 5158, Counties.

Husnotiella revoluta var. *palmeri* (Card.) Thér. On soil of limestone ledge, Alley Spring State Park, Shannon Co., *E. B. Drew* 67 (UMO, det. A. J. Sharp. Verification of Dr. Sharp's determination has recently been made by Mr. E. B. Bartram).

Tortula papillosa Wils. A few scattered plants mixed with *Frullania riparia* on bark of cedar, Roaring River State Park, Barry Co, 5625 (DUKE, examined by L. E. Anderson). This collection is noteworthy in adding a station to the midwestern gap in the known distribution of the species (Weber, 1957).

Bryum gemmiparum DeNot. Forming dense cushions on limestone rocks subject to inundation and/or seepage, Ozark, 5328, 5329, and Taney, 5191, 5324 (FSU, TENN, US) Counties. (All collections det. by A. LeRoy Andrews.) This species was first reported for Missouri by Kindberg (1907) with no location given.

Bryum tortifolium Funck. On limestone rocks in swiftly flowing water of Mill Creek, McDonald Co, 5377 (FSU, TENN, US, det. verified by A. LeRoy Andrews). This species and *D. rugosum* are interesting additions to the flora, for they certainly constitute elements with distinctly northern affinities.

Mnium stellare Hedw. Mixed with other bryophytes on rich, shaded calcareous soil, Christian, 5280, and Texas, 5494, Counties.

Rhynchostegiella compacta (C. M.) Loeske. Forming loose mats on floor of cave near Aller Spring State Park, Shannon Co., 5516 [det. by H. S. Conard, who noted that although this collection lacks the compact nature usually associated with it, the fact that the leaves are generally less than 1 mm. long and paraphyllia are lacking seems to exclude it from being *R. compacta* ssp. *americana* (Grout) Wijk & Marg.].

Amblystegium riparium fo. *elongatum* (B. & S.) Moenk. On sandstone along bottom of creek, St. Clair Co, 4774 (det. by H. S. Conard).

Hypnum molluscum Hedw. Mixed with *Dicranum scoparium* on shaded soil, Big Springs State Park, Shannon Co, 4499 (examined by H. S. Conard).

Brotherella tenuirostris (BSG) Broth. On bark of cedar near Forsyth, Taney Co, 5205 (UT, FSU, US, examined by H. S. Conard).

Literature Cited

Kindberg, N. C. 1907. New or less known Bryineae from N. America. I. Found in Missouri by N. L. T. Nelson. Rev. Bryol. 34: 25-29.

Weber, W. A. 1957. *Tortula papillosa* in New Mexico. Bryologist 60: 143-145.

THE MOSSES OF PAYNE COUNTY, OKLAHOMA

G. J. Ikenberry, C. D. Bird, and W. F. Mahler[1]

Little information is available on the mosses of Oklahoma as only 160 species have been recorded and these have come from 22 of the 77 counties. Most reports are from eastern and southern areas while the north-central and western counties are very poorly known. Payne County, in north-central Oklahoma, is represented by only one citation, that of *Barbula cruegeri*, a new record for the state (Bird, Proc. Okla. Acad. Sci., in press). It is the purpose of this paper to present the results of extensive collections in the county by Dr. G. J. Ikenberry and by two of his students, Dr. C. D. Bird and Mr. W. F. Mahler. The information should be especially timely as Payne County is the site of this summer's AIBS meetings.

Payne County covers an area of 697 square miles. Rainfall varies from 30-35 inches with the greatest amounts from April to September. Soils are coarsely textured, sandy, and have a low water-holding capacity. Rolling redbed plains occupy most of the region. The vegetation is a transitional community between forest and prairie with woodland extending into grasslands along streams. The prairies are dominated by blue-stem grasses while common forest trees are post and black-jack oaks.

One collecting site, Ghost Hollow, has yielded a greater variety of species than any other place. It is located in a thickly wooded ravine which drains into the Cimarron River, one mile northeast of the town of Ripley. Eastern species, rarely found elsewhere in the county, are *Aulacomnium heterostichum, Bartramia pomiformis, Fissidens julianus, Hygroamblystegium irriguum, Leucobryum glaucum,* and *Pogonatum brachyphyllum.*

Duplicates of all records have been deposited in the private herbarium of the senior author while originals have been retained in the herbaria of the original collectors. In addition, some of Bird's duplicates have been deposited at the National Museum of Canada and at the New York Botanical Garden.

Nomenclature follows that found in Grout's *Moss Flora of North America* with some exceptions where more recent works suggest other usage. In the latter case the older term is placed in brackets.

We express our thanks to the following, who have verified some of the material: A. J. Grout, W. C. Steere, A. J. Sharp, and H. Crum.

[1] Dept. of Botany, Oklahoma State University, Stillwater, Okla.

Amblystegium juratzkanum
Amblystegium varium
Anomodon minor
Anomodon rostratus
Archidium ohioense
Astomum muhlenbergianum
Atrichum angustatum
Atrichum undulatum
Aulacomnium heterostichum
Barbula cruegeri
Barbula unguiculata
Bartramia pomiformis
Brachythecium flexicaule
Brachythecium oxycladon
Brachythecium salebrosum
Brachythecium starkei
Bruchia sullivanti
Bruchia texana
Bryum argenteum
Bryum cuspidatum
Campylium chrysophyllum
Campylium hispidulum
Desmatodon obtusifolius
Desmatodon plinthobius
Dicranella heteromalla
Dicranella varia
Didymodon tophaceus
Ditrichum pallidum
Entodon seductrix
Eurhynchium hians
Eurhynchium pulchellum var. *praecox*
Fabronia ciliaris
Fissidens cristatus
Fissidens julianus
Fissidens obtusifolius
Fissidens taxifolius
Fissidens viridulus
Funaria flavicans
Funaria hygrometrica
Grimmia apocarpa
Grimmia laevigata
Grimmia wrightii
Hedwigia ciliata
Homomallium adnatum
Hygroamblystegium irriguum
Leskea australis
Leskea polycarpa
Leucobryum glaucum
Leucodon julaceus
Lindbergia brachyptera
Mnium affine
Mnium cuspidatum
Orthotrichum diaphanum
Orthotrichum pumilum
Phascum cuspidatum var. *americanum*
Physcomitrium kellermani
Physcomitrium pyriforme (*P. turbinatum*)
Plagiothecium geophilum
Pleuridium subulatum
Pleurochaete squarrosa
Plagiothecium deplanatum
Pogonatum brachyphyllum
Ptychomitrium incurvum
Pyramidula tetragona
Sematophyllum carolinianum
Thelia asprella (*T. lescurii*)
Tortula pagorum
Weisia controversa (*W. viridula*)
Venturiella sinensis

None of the above represents any outstanding range extensions except for *Venturiella sinensis*. This apparently is the second report of the moss from North America. Material was collected by Dr. Ikenberry on February 15, 1942, six feet up the trunk of an elm tree, several hundred yards southeast of the campus of Oklahoma State University. The plant has not been found since the original collection.

NOTES ON THE CURRENT LIST OF NEW MEXICAN HEPATICAE

C. D. BIRD[1]

Recent study of the New Mexican bryophyte flora led me to prepare a card file of mosses and hepatics that had been recorded in the literature. A comparison of the hepatic cards with Shields' recent list (1954) revealed some discrepancies, and these are reported here.

First, a list of 46 hepatics is given, but close examination reveals that owing to synonymy this must be reduced to 41. *Asterella fragrans* and *Fimbraria fragrans* are now *Asterella saccata* (Wahl.) Evans (Frye & Clark, 1937-1947). *Jungermannia barbata* and *Lophozia barbata* have become *Barbilophozia barbata* (Schmid.) Loeske (Frye & Clark, 1937-1947). *Fegatella conica* is now *Conocephalum conicum* (L.) Dum. (Frye & Clark, 1937-1947). *Madotheca platyphylla* has become *Porella platyphylla* (L.) Lindb. (Frye & Clark, 1937-1947).

Second, the list decreases from 41 to 40 with the removal of *Asterella saccata*. Its presence in New Mexico was based on a collection made by Fendler and distributed by Austin in 1873 as *Hepaticae Boreali-Americanae* 136c. Evans (1920) pointed out that this material was not *A. saccata*.

Third, *Frullania brittoniae* Evans must be removed as the collection reported as this (Standley, 1915; Arsène, 1933) has since been examined by Prof. Evans and found to be *F. eboracensis* Gottsche (Miss Caroline Haynes in litt. to Bro. Arsène).

Fourth, the list is further reduced to 38 with the loss of *Porella platyphylla* var. *platyphylla*. This was reported by Standley in 1915, but in 1916 he said that Prof. Evans felt that collections bearing this name should be referred to *P. platyphylla* var. *platyphylloidea* (Schwein.) Frye & Clark.

Fifth, the total must be raised to 44 with the addition of six hepatics reported elsewhere in the literature. These are *Blasia pusilla* L. (Evans, 1922), *Chiloscyphus pallescens* (Ehrh.) Dum. (Ammons, 1940), *Orthocaulis floerkii* (Web. & Mohr) Buch (Frye & Clark, 1937-1947), *Riccia austini* Steph. (Little, 1942), *R. crystallina* L. (Little, 1942), and *R. sorocarpa* Bisch. (Little, 1942).

[1] Botany Dept., University of Alberta, Edmonton, Alta.; formerly Oklahoma State University, Stillwater, Okla.

LITERATURE CITED

AMMONS, NELLE. 1940. A manual of the liverworts of West Virginia. Amer. Midl. Nat. 23: 3-164.

ARSÈNE, G. 1933. Hépatiques du Nouveau-Mexique (U. S. A.) determinées par Miss Caroline Coventry Haynes. Ann. Crypt. Exot. 6: 150-160.

EVANS, A. W. 1920. The North American species of *Asterella*. Contr. U. S. Nat. Herb. 20: 247-312.

———. 1922. Notes on North American Hepaticae. 9. Bryol. 25: 25-33.

FRYE, T. C. & LOIS CLARK. 1937-1947. Hepaticae of North America. 5 pts. Univ. Washington Press.

LITTLE, E. L. 1942. Notes on the genus *Riccia* in New Mexico. Bryol. 45: 147-148.

SHIELDS, LORA M. 1954. Current list of New Mexico Hepaticae. Bryol. 57: 18-19.

STANDLEY, P. C. 1915. Hepaticae of New Mexico. Bryol. 18: 81-83.

———. 1916. Additional notes upon New Mexican Hepaticae. *Ibid.* 19: 64-65.

COLOLEJEUNEA TUBERCULATA FOUND IN CUBA

SIGFRID ARNELL[1]

Schuster (1956, p. 104) said that *Cololejeunea tuberculata* Evans is "known only from a restricted region of southern Florida (Dade Co.), in the so-called Everglade Keys, and from a few stations in the Oligocene Island area of western Florida. As a consequence of the minute size, and the very scattered occurrence, the species has been but very rarely collected. It will almost certainly be found in the West Indies."

In a small collection of liverworts from south of Havana, Cuba, made by Mr. Gillis Een in 1950, I found this diminutive plant rather sparingly creeping on *Thuidium* and *Hymenophyllum*. The species thus occurs in the West Indies and will probably be found also in other localities in Cuba and the other islands of the Caribbean. For a description of the plant, I refer to the paper by Schuster mentioned above.

In a specimen of *Cheilolejeunea curnowii* St. collected in about the same locality, I found a plant that probably belongs to *Cololejeunea diaphana* Evans, richly provided with discoid gemmae. As I could only trace this single plant, I am not quite sure of the identity, but this species probably also occurs in the West Indies.

LITERATURE CITED

SCHUSTER, R. M. 1956. North American Lejeuneaceae. IV. Paradoxae: *Cololejeunea, Diplasiolejeunea*. Jour. Elisha Mitchell Sci. Soc. 70: 103-106.

[1] Ekorrvägen 11, Bromma 15, Sweden.

A PRELIMINARY LIST OF MICRONESIAN BRYOPHYTES

HARVEY A. MILLER[1]

Micronesia includes a vast area comprised of numerous tiny land masses in the western tropical Pacific Ocean. The area includes the Bonin (B), Volcano (V), Mariana (M), Palau (P), Yap (Y), Caroline (C), Marshall (Ms), and Gilbert (G) island groups. Many of the islands are low, arid atolls with a limited bryoflora, but the high islands, *e.g.*, Guam, Yap, Palau, Ponape, and Kusaie, appear to support a rich bryoflora in wet mountain-top forests.

The first bryophyte collections were made between 1817 and 1820 by Charles Gaudichaud in the Mariana Islands—principally in Guam. These collections were reported by Schwaegrichen (1811-42) and by Gaudichaud (1828) himself. Bory de St. Vincent (1827-29) reported a number of cryptogams collected on Guam and Oualau (Kusaie) during the visit of the "Coquille" between 1822 and 1825. Mertens (1835) visited the Caroline Islands on the "Séniavine" and collected several species of Hepaticae reported in the *Synopsis Hepaticarum* and some mosses. These three collections appear to be the basis for most of the reports of Micronesian bryophytes until the latter part of the 19th century.

Small but important additional collections were listed by Stephani (1900-24, 1902), Brotherus (1898, 1902, 1924-25), and Dixon (1927, 1928). In 1929, Horikawa began a series of publications dealing with the Hepaticae of Japan and Micronesia with the result that many new species were described. During World War II, important papers were contributed by Sakurai (1943), Dixon (1943), and Bartram (1945). Over the past ten years, lists by Andrews (1951), Glassman (1952), Miller (1953, etc.), Moul (1957, 1958) and Inoue (1959) have substantially increased the number of reported species.

Inasmuch as these reports are widely scattered and not easily assembled, the following list has been prepared to serve as a base for further study of Micronesian bryophytes. No attempt has been made to provide full synonymy because published reports can be based on misidentifications and voucher specimens have not yet been seen. Island groups are indicated by the letters inserted in the introductory paragraph, and there has been no attempt to

[1] Dept. of Botany, Miami University, Oxford, O. This publication was completed with the assistance of the National Science Foundation (G-7115).

account for extra-Micronesian distribution. Sources for records are indicated for each species. Finally, the author welcomes the assistance and comments of other bryologists relative to the preparation of a "Bryoflora of Micronesia" now in progress.

Musci

Acanthocladium monostictum Broth. Y, Brotherus, 1902.
Acanthorrhynchium grosso-papillatum (Broth.) Fl. C, Schiffner, 1924-25; P, Sakurai, 1943.
A. papillatum (Harv.) Fl. Ponape (C), Sakurai, 1943, Glassman, 1952.
Acroporium brevisetulum (C. M.) Jaeg. Ponape (C), Glassman, 1952, Bartram, 1945.
Aerobryopsis longissima (Dozy & Molk.) Fl. C, Schiffner, 1924-25; Ponape (C) and P, Sakurai, 1943; Kusaie and Ponape (C), Bartram, 1945; Ponape (C), Glassman, 1952.
A. pernitens Sak. P, Sakurai, 1943.
Aerobryum lanosum Mitt. Y, Brotherus, 1902.
Barbella pendula (Sull.) Fl. Ponape (C), Sakurai, 1943, Glassman, 1952.
Barbula indica (Schw.) Brid. Guam (M), Dixon, 1943.
B. lovisiadum Broth. Y, Brotherus, 1902.
Brachymenium indicum (Dozy & Molk.) Dozy & Molk. Onotoa, Tarawa, Beru, Abemama, Little Makin (G), Dixon, 1927.
B. melanothecium (C. M.) Jaeg. Onotoa (G), Moul, 1957, 1958; Puluwat (C), Miller, 1956.
Brotherella falcata (Dozy & Molk.) Fl. P, Sakurai, 1943.
Bryum nitens Hook. Ailuk, Likiep, Wotho, Ujae, Lae, Arno (Ms), Miller, 1953, 1955; Kapingamarangi (C), Miller, 1956.
Calymperes chamissonis Besch. "Koralleninseln der Sudsee," Roth, 1912. Doubtfully in Micronesia as island groups are not named.
C. crassinerve (Mitt.) Jaeg. Butaritari (G), Dixon, 1927.
C. cristatum Hampe. Ponape (C), Horikawa, 1935.
C. dozyanum Mitt. Butaritari (G), Dixon, 1927.
C. hyophilaceum C. M. *in* Besch. Arno (Ms), Miller, 1953; Kapingamarangi (C), Miller, 1956; var. *robustum* Fl. Lae (Ms), Miller, 1955.
C. orientale Mitt. Ponape (C), Sakurai, 1943, Glassman, 1952.
C. serratum A. Br. *ex* C. M. Ponape (C), Bartram, 1945, Glassman, 1952.
C. tahitense (Sull.) Mitt. Guam (M), Bartram, 1945.
C. tenerum C. M. Butaritari (G), Dixon, 1927; Bikini, Eniwetok, Rongerik, Rongelap (Ms), Taylor, 1950; Majuro, Kwajalein (Ms), Moul, 1957; Utirik, Ailuk, Likiep, Wotho, Ujae, Lae, Ujelang, Arno (Ms), Miller, 1955; Kapingamarangi (C), Miller, 1956. A very widespread species found in almost every atoll collection.
C. thyridioides Broth. Y, Brotherus, 1902, 1924, Roth, 1911; C. Bartram, 1945; Majuro (Ms), Moul, 1957; Arno (Ms), Andrews, 1951; Arno (Ms), Miller, 1953 (as *C. mollucense*).
C. volkensii Broth. Y, Brotherus, 1902; P, C, Dixon, 1943.
Calyptothecium recurvulum (C. M.) Broth. M, Schiffner, 1925.
C. urvilleanum (C. M.) Broth. C, Schiffner, 1925.
Campylopus umbellatus (Arn.) Par. Ponape (C), Glassman, 1952.
Claopodium assurgens (Sull. & Lesq.) Card. B, Horikawa, 1935.
Clastobryella tenella Fl. Rota (M), Sakurai, 1943.
Dicranella ponapensis Sak. Ponape (C), Sakurai, 1943, Glassman, 1952.

Distichophyllum cuspidatum Dozy & Molk. Ponape (C), Sakurai, 1943, Glassman, 1952.
D. fasciculatum Mitt. ?M, Schiffner, 1925.
D. imbricatum Mitt. ?M, Schiffner, 1925.
D. undulatum Bosch & Sande. Ponape (C), Horikawa, 1949, Glassman, 1952.
Ectropothecium carolinarum Broth. Y, Brotherus, 1902.
E. cyperoides (Hook.) Jaeg. Y, Brotherus, 1902; Kapingamarangi, Puluwat, Nukuoro (C), Miller, 1956.
E. dealbatum (Hornsch. & Reinw.) Jaeg. Guam (M), Dixon, 1943.
E. diversirete Bartr. Ponape (C), Bartram, 1945, Glassman, 1952.
E. hyalinum (Hornsch. & Reinw.) Fl. Ponape (C), Sakurai, 1943, Glassman, 1952.
E. incubans var. *scaberulum* (Broth.) Fl. Guam (M), Bartram, 1945.
E. inflectens (Brid.) Jaeg. Y, Brotherus, 1902.
E. monumentorum (Duby) Jaeg. C, Schiffner, 1925; Maraki, Tarawa, Tabiteuea, Butaritari, Ellice (G), Dixon, 1927; Arno (Ms), Miller, 1953. This species is apparently close to *E. sandwichense* and may prove to be the same.
E. ponapense Bartr. Ponape (C), Bartram, 1945, Glassman, 1952.
E. sandwichense (Hook. & Arn.) Mitt. Arno (Ms), Andrews, 1951: Ujae, Lae (Ms), Miller, 1955.
E. sparsipilum (Bosch & Sande) Jaeg. Ponape (C), Sakurai, 1943, Glassman, 1952.
Endotrichella elegans (Dozy & Molk.) Fl. C, Schiffner, 1925; Ponape (C), Sakurai, 1943, Glassman, 1952; Kusaie (C), Bartram, 1945.
E. nematosa Bartr. Ponape (C), Bartram, 1945, Glassman, 1952.
Entodon cernuus (C. M.) Jaeg. Rota (M), Sakurai, 1943.
Exodictyon blumii (C. M.) Fl. Ponape (C), Bartram, 1945, Glassman, 1952; Kusaie (C), Horikawa, 1949.
E. papillosum (Mitt.) Fl. Ponape (C), Sakurai, 1943, Glassman, 1952.
Fabronia ? *marianna* Schw. M, Gaudichaud, 1828.
Fissidens kondoi Sak. Ponape (C), Sakurai, 1943, Glassman, 1952.
F. nobilis Griff. Chichijima (B), Horikawa, 1936.
F. zollingeri Mont. Y, Brotherus, 1902.
Floribundaria aurea (Griff) Broth. Rota (M), Sakurai, 1943.
F. floribunda (Dozy & Molk.) Fl. Ponape (C), Dixon, 1943, Glassman, 1952.
Garckea phascoides (Hook.) C. M. Ponape (C), Sakurai, 1943, Glassman, 1952.
Garovaglia carolinensis Dix. Ponape (C), Dixon, 1943. Not listed by Glassman.
Himantocladium loriforme (Sande) Fl. Ponape (C), Sakurai, 1943, Glassman, 1952; P, Sakurai, 1943.
Hookeria nipponensis (Besch.) Broth. Chichijima (B), Horikawa, 1936.
Hyophila beruensis Dix. Beru (G), Dixon, 1927.
Hypnum cupressiforme Schw. M, Gaudichaud, 1828. Based on an *Ectropothecium?*
H. delicatulum Schw. M, Gaudichaud, 1828. Based on a *Thuidium?*
H. eximium Sull. & Lesq. B, Sullivant & Lesquereux, 1859.
H. recurvans Schw. M, Gaudichaud, 1828.
H. scaturiginum Schw. M, Gaudichaud, 1828. Apparently an *Ectropothecium.*
Hypopterygiopsis reptans Sak. Koror (P), Sakurai, 1943. A *Selaginella?*

Isopterygium smallii (Sull. & Lesq.) Par. B, Sullivant & Lesquereux, 1859.
I. subalbidum (Sull. & Lesq.) Par. B, Sullivant & Lesquereux, 1859.
Leucobryum boninenses Sull. & Lesq. B, Sullivant & Lesquereux, 1859.
L. sanctum Hampe. Ponape (C), Bartram, 1945, Glassman, 1952.
Leucophanella amoena (Broth.) Fl. Ponape (C), Sakurai, 1943, Glassman, 1952; P, Sakurai, 1943.
L. bornensis (Hampe) Fl. Y, Sakurai, 1943.
Leucophanes albescens C. M. C, Bartram, 1945.
L. candidum (Hornsch.) Lindb. Ponape (C), Sakurai, 1943, Glassman, 1952; Koror (P), Sakurai, 1943.
L. glauculum C. M. Y, Brotherus, 1902; Arno (Ms), C, Miller, 1953.
L. glaucum (Schw.) Mitt. P, Dixon, 1943.
L. octoblepharoides Brid. Y, Brotherus, 1902, Bartram, 1945, Sakurai, 1943; Ponape (C), Glassman, 1952.
L. smaragdinum (Mitt.) Par. Little Makin, Ellice (G), Dixon, 1927; Guam (M), Bartram, 1945; Arno (Ms), Andrews, 1951; Kapingamarangi, Nukuoro (C), Miller, 1956.
L. subglaucescens C. M. Guam (M), Dixon, 1943.
Macromitrium okabei Sak. Ponape (C), Sakurai, 1943, Glassman, 1952.
M. semipellucidum Dozy & Molk. Guam (M), Bartram, 1945.
M. subuligerum (Dozy & Molk.) Fl. C, Bartram, 1945.
M. urceolatum Schw. M, Gaudichaud, 1828.
Meiothecium bogoriense Fl. Ponape (C), Sakurai, 1943, Glassman, 1952.
M. microcarpum (Hampe) Mitt. Guam (M), Bartram, 1945.
M. papillosum (Broth.) Broth. Arno (Ms), Andrews, 1951.
Mniomalia semilimbata C. M. Kusaie, Ponape (C), Sakurai, 1943, Horikawa, 1951, Glassman, 1952.
Mnium maximowiczii Lindb. B, Horikawa, 1935.
M. kawadei Okam. B, Horikawa, 1934.
Neckera lepeneana Mont. M, Bescherelle, 1894.
N. undulata Schw. M, Gaudichaud, 1828.
N. urvilleana C. M. C, Bescherelle, 1894.
Neckeropsis gracilenta (Dozy & Molk.) Fl. Ponape, Kusaie (C), Sakurai, 1943, Bartram, 1945, Glassman, 1952; P, Sakurai, 1943.
Octoblepharum albidum Schw. M, Gaudichaud, 1828.
Orthorrhynchium phyllogonioides (Sull.) E. G. Britt. Kusaie (C), Horikawa, 1951.
Papillaria intricata (Mitt.) Jaeg. Guam (M), Bartram, 1945.
Pelekium velatum Mitt. P, Sakurai, 1943; Ujelang (Ms), Miller, 1955.
Pterogoniella jagori (C. M.) Jaeg. Y, Brotherus, 1902.
Rhacelopus ponapensis Sak. Ponape (C), Sakurai, 1943, Glassman, 1952.
Rhacopilum pacificum Besch. Guam (M), Dixon, 1943.
Schistomitrium apiculatum Dozy & Molk. Ponape (C), Sakurai, 1943, Glassman, 1952.
Sematophyllum microcladium (Dozy & Molk.) Broth. C, Bartram, 1945.
S. subhumile (C. M.) Fl. P, Sakurai, 1943.
Splachnobryum indicum C. M. Wotho, Arno (Ms), Miller, 1953, 1955.
S. pacificum Dix. Tabiteuea (G), Dixon, 1928.
Spiridens balfourianus Grev. Ponape (C), Bartram, 1945, Glassman, 1952.
S. capilliferus Mitt. Ponape (C), Glassman, 1952.
S. reinwardtii Nees. Ponape (C), Sakurai, 1943, Glassman, 1952.
Syrrhopodon banksii C. M. Y, Brotherus, 1902; C, Bartram, 1945.
S. borneensis (Hampe) Jaeg. P, Dixon, 1943.
S. carolinarum Broth. Y, Brotherus, 1902.

S. ciliatus (Hook.) Schw. Ponape (C), Sakurai, 1943, Glassman, 1952.
S. croceus Mitt. Ponape (C), Sakurai, 1943, Glassman, 1952; P, Sakurai, 1943.
S. graeffeanus C. M. Ponape (C), Bartram, 1945, Glassman, 1952.
S. mulleri (Dozy & Molk.) Sande. Ponape (C), Glassman, 1952.
S. revolutus Dozy & Molk. M, Brotherus, 1924.
S. rigescens Schw. M, Gaudichaud, 1828.
S. rufescens Hook. & Grev. M, Brotherus, 1924.
S. tristichus Nees. Ponape (C), Horikawa, 1935, Sakurai, 1943, Glassman, 1952.
Taxithelium instratum Brid. Y, Brotherus, 1902.
T. lindbergii (Sande) Ren. & Card. Nukuoro (C), Miller, 1956.
Thuidium glaucinoides Broth. Ponape (C), Bartram, 1945, Glassman, 1952.
T. meyenianum (Hampe) Dozy & Molk. P, Dixon, 1943.
T. micropteris Besch. B, Horikawa, 1935.
T. orientale Mitt. Ponape (C), Sakurai, 1943, Glassman, 1952; P, Sakurai, 1943.
T. plumulosum (Dozy & Molk.) Sande. Guam (M), Bartram, 1945; Kapingamarangi (C), Miller, 1956.
Thyridium constrictum Mitt. Ponape (C), Sakurai, 1943, Glassman, 1952; P, Sakurai, 1943.
T. fasciculatum (Hook. & Grev.) Mitt. Ponape (C), Sakurai, 1943, Glassman, 1952; P, Sakurai, 1943, Bartram, 1945.
T. undulatum (Lindb.) Fl. Ponape (C), Sakurai, 1943, Glassman, 1952.
Trematodon drepanellus Besch. Chichijima, Hahajima (B), Horikawa, 1936.
Trichosteleum carolinarum Dix. P, Dixon, 1943.
T. elegantissimum Fl. P, Sakurai, 1943.
T. hamatum (Dozy & Molk.) Jaeg. Ponape (C), Sakurai, 1943, Glassman, 1952; Arno (Ms), Andrews, 1951; Kapingamarangi, Nukuoro (C), Miller, 1956.
T. grossopapillatum Broth. Y, Brotherus, 1902.
Trichostomum minutissimum Sak. Koror (P), Sakurai, 1943.
Vesicularia dubyana (C. M.) Broth. Ponape (C), Sakurai, 1943, Glassman, 1952.
V. inflectens (Brid.) C. M. Ponape (C), Bartram, 1945, Glassman, 1952.
V. perangusta Dix. Guam (M), Dixon, 1943.
Warburgiella leptocarpa (Schw.) Fl. Ponape (C), Sakurai, 1943, Glassman, 1952; P, Sakurai, 1943.
W. subleptorhynchoides Fl. Koror (P), Sakurai, 1943.

Hepaticae

Acromastigum capillare (St.) Evans. Ponape (C), Horikawa, 1949, Glassman, 1952.
A. palauense Inoue. P, Inoue, 1959.
Anastrophyllum subcomplicatum (Lehm. & Lindenb.) St. M, Stephani, 1900-24.
Anthoceros laevis L. Chichijima, Hahajima (B), Horikawa, 1936.
Archilejeunea bidentata Horik. Hahajima (B), Horikawa, 1931, 1934.
A. mariana (Gott.) St. Y, Stephani, 1902; M. Verdoorn, 1934; P, Inoue, 1959; C, Stephani, 1900-24; Kapingamarangi (C), Miller, 1956; Ujae, Lae, Ujelang, Kwajalein (Ms), Miller, 1955, Moul, 1957.
Bazzania intermedia (Gott. & Lindenb.) Trev. Chichijima (B), Horikawa, 1934.

Bazzania platycnema (Schw. *ex* St.) comb. nov. (*Mastigobryum platycnemum* Schw. *ex* St. Bull. Herb. Boiss. *2*, 8: 776. 1908.) M, *op. cit.*

B. spiralis (Nees?). Ponape (C), Glassman, 1952. (or *B. decisens*)

B. watanabei Inoue. P, Inoue, 1959.

Boninoleptocolea drepanolejeunoides Horik. Chichijima (B), Horikawa, 1936.

Brachiolejeunea sandvicensis (Gott.) Evans. Chichijima, Hahajima (B), Horikawa, 1934, 1952.

Calypogeia arguta Nees. Chichijima (B), Horikawa, 1934 (as *C. bifurca* Aust.).

Caudalejeunea reniloba (Gott.) St. M, Verdoorn, 1934 [includes records of *C. recurvistipula* (Gott.) St.]

C. stephanii (Spr.) St. P, Inoue, 1959.

Cerotolejeunea moniliata Herz. P, Inoue, 1959.

Chandonanthus hirtellus (Web.) Mitt. Pacific Islands, Schiffner, 1898. To be expected in Micronesia.

Cheilolejeunea bidentula (St.) Inoue. P, Inoue, 1959.

C. imbricata (Nees) Hatt. P, Inoue, 1959.

C. intertexta (Lindenb.) St. Y, Stephani, 1902; P, Inoue, 1959; Kapingamarangi, Nukuoro (C), Miller, 1956.

Chiastocaulon dendroides (Nees) Carl. Kusaie (C), Horikawa, 1950.

Chiloscyphus argutus (Reinw., Bl. & Nees) Nees. C, Gottsche, et al., 1845; Hahajima (B), Horikawa, 1934.

Cololejeunea falcata (Horik.) comb. nov. (*Physocolea falcata* Horik., Jour. Sci. Hiroshima Univ. Ser. B, Div. *2*, 1: 22. 1931.) Chichijima (B), *op. cit.*

C. kapingaensis Miller. Kapingamarangi (C), Miller, 1956.

C. minutissima (Sm.) Schiffn. Chichijima (B), Horikawa, 1934 (sub *Aphanolejeunea*).

C. wightii St. Kapingamarangi, Nukuoro (C), Miller, 1956.

Dendroceros japonicus St. Hahajima (B), Horikawa, 1934.

Drepanolejeunea riddleana St. Arno (Ms), Andrews, 1951.

D. tenuis (Reinw., Bl. & Nees) Schiffn. Hahajima (B), Horikawa, 1936, 1950, 1952.

Dumortiera hirsuta (Sw.) Reinw., Bl. & Nees. Chichijima, Hahajima (B), Horikawa, 1934, 1951; Kusaie (C), Horikawa, 1949.

Eucalyx boninensis Horik. Chichijima (B), Horikawa, 1934.

Euosmolejeunea parkinsonii St. C, Stephani, 1900-24. Considered to be doubtfully present as the island cited is Ovalau in the Fiji group.

Frullania boninensis Horik. Chichijima, Hahajima (B), Horikawa, 1934.

F. cognata Lindenb. Stephani's report (1900-24) of "Falklands Insulae (olim Marianae)" doubtfully refers to our region. Mertens' "n. 21. sub nom. Frullania nodulosae" is probably from our area as reported by Gottsche, *et al.*, 1845.

F. curiosissima Horik. Chichijima (B), Horikawa, 1936.

F. gaudichaudii Nees & Mont. M, Gaudichaud, 1846.

F. gracilis (Reinw., Bl. & Nees) Dum. P, Inoue, 1959.

F. mertensiana Lindenb. M, Gottsche *et al.*, 1845.

F. nodulosa (Reinw., Bl. & Nees) Nees. M, Verdoorn, 1930, Hattori, 1951; Ponape (C), Verdoorn, 1930.

F. replicata (Nees) Spr. M, Schiffner, 1898.

F. thuillerii Nees. M, Gottsche *et al.*, 1845.

F. utriculata var. *powelliana* (Steph.) Verd. Ponape (C), Verdoorn, 1930.

F. viridis Horik. Chichijima, Hahajima (B), Horikawa, 1930, 1934.

Hygrolejeunea devexiloba St. P, Inoue, 1959 (as *Hyglolejeunea*).
H. latistipula Schiffn. P, Inoue, 1959 (as *Hyglolejeunea*).
H. parkinsonii St. Ponape (C), Stephani, 1900-24.
H. rosea St. M, Stephani, 1900-24.
H. sordida (Nees) St. M, Schiffner, 1898; P, Inoue, 1959.
H. vesicata (Mitt.) St. Majuro (Ms), Moul, 1958; Wotho, Lae (Ms), Miller, 1955.
Jackiella unica St. Ponape (C), Stephani, 1900-24.
Jungermannia diversifolia Lehm. & Lindenb. M, Gottsche *et al.*, 1844; M, Lehmann, 1838.
J. lagenifera Schw. M, Gaudichaud, 1828.
J. serpyllifolia Dicks. M, Gaudichaud, 1828. This may prove to be a species of *Cheilolejeunea* or a related genus.
J. transversalis var. β. *minor* Schwaegr. M, Gaudichaud, 1828. This name is probably applied to some plant in the Lejeuneaceae Holostipae.
Lejeunea boninensis Horik. Hahajima (B), Horikawa, 1931, 1934.
L. clavata Lindenb. Kusaie (Ualau) (C), Gottsche *et al.*, 1845, Stephani, 1900-24, as *Eulejeunea;* Y, Stephani, 1902.
L. flava (Sw.) Lindenb. Y, Stephani, 1902, as *Eulejeunea.*
L. planiloba Evans. C, Stephani, 1900-24, as *Eulejeunea.*
L. vitrea Nees. Guam (Guaham), Kusaie (Ualau), (C) Gottsche *et al.*, 1845. Perhaps a species of *Leptolejeunea.*
L. xanthocarpa Lehm. & Lindenb. M, Gottsche *et al.*, 1845. Perhaps a *Leucolejeunea.*
Lepidozia biloba Herz. Kusaie (C), Horikawa, 1949.
L. wallichiana Gott. P, Inoue, 1959.
Leptocolea minutilobula Horik., Jour. Sci. Hiroshima Univ. Ser. B. Div. 2, 1: 16. 1931. This plant should be named **Cololejeunea minutilobula** (Horik.) comb. nov. Hahajima (B), Horikawa, *op. cit.* and 1934.
L. nakaii Horik., Jour. Sci. Hiroshima Univ. Ser. B. Div. 2, 1: 18. 1931. This plant should be named **Cololejeunea nakaii** (Horik.) comb. nov. Chichijima, Anijima (B), Horikawa, *op. cit.* and 1934.
Leptolejeunea satakeana Hatt. P, Hattori, 1951.
L. subacuta St. Chichijima (B), Horikawa, 1936.
Lophocolea defectistipula St. C, Stephani, 1900-24.
Lopholejeunea applanata (Reinw., Bl. & Nees) St. P, Inoue, 1959.
L. brunnea Horik. Hahajima (B), Horikawa, 1931, 1934.
L. densiloba Horik. P, Horikawa, 1929.
L. subfusca (Nees) St. Y, Stephani, 1902; P, Inoue, 1959; Ujae, Arno (Ms), Verdoorn, 1934, Stephani, 1900-24, as *L. finschiana*, Andrews, 1951, Miller, 1955.
L. toyoshimae Horik. Chichijima, Hahajima (B), Horikawa, 1931, 1934. Verdoorn (1934) indicated that this species is very close to *L. eulopha.*
L. yapensis St. Y, Stephani, 1902, 1900-24, Verdoorn, 1934.
Marchantia platycnemos Schw. M, Gaudichaud, 1828. Of questionable identity but listed as a synonym of *M. papillata* Raddi by Gottsche *et al.*, 1846.
Mastigolejeunea humilis (Gott.) Spr. Guam (M), Verdoorn, 1934, etc.; Y, Stephani, 1902. Records for *M. guahamensis* are included here.
Mastigophora diclados (Brid.) Nees. B, Horikawa, 1951; Alamagan (M), Horikawa, 1951; Kusaie (C), Horikawa, 1951; Ponape (C), Glassman. 1952; P, Inoue, 1959.
Metzgeria furcata (L.) Lindenb. Hahajima (B), Horikawa, 1934.
Microlejeunea albicans (Nees) St. P, Inoue, 1959.

M. cummingiana St. P, Inoue, 1959.
M. gracillima (Mitt.) Carr. & Pears. Kapingamarangi (C), Miller, 1956.
M. lunulatiloba Horik. Chichijima, Hahajima (B), Horikawa, 1931, 1934.
M. ponapensis Horik. Ponape (C), Horikawa, 1936, Glassman, 1952.
Pallavicinia lyellii (Hook.) S. F. Gray. Chichijima (B), Horikawa, 1936.
Platylejeunea volkensii St. Y, Stephani, 1902.
Plagiochila hyalina Lindenb. Kusaie (Ualan) (C), Gottsche *et al.*, 1847.
P. japonica Sande. Hahajima (B), Horikawa, 1934.
Plectocolea ariadne Mitt. P, Inoue, 1959.
Pleurozia gigantea (Web.) Lindb. Ponape (C), Horikawa, 1935, Glassman, 1952.
Porella parvistipula (St.) Hatt. Hahajima (B), Horikawa, 1934. Considered a synonym of *P. grandiloba* (*e.g.*, see Hattori, Jour. Hattori Bot. Lab. 8: 27. 1952).
Ptychocoleus cumingianus (Mont.) Trev. C, Verdoorn, 1934 (includes *Mastigolejeunea javanica*).
P. pycnocladus (Tayl.) St. Arno (Ms), Andrews, 1951.
Pycnolejeunea imbricata (Nees) St. Hahajima (B), Horikawa, 1952.
P. molischii Schiffn. Chichijima (B), Horikawa, 1934, 1931 (as *P. boninensis*).
P. tosana St. Hahajima (B), Horikawa, 1934.
Radula anceps Sande. P, Inoue, 1959.
R. ceramensis St. C, Schiffner, 1898, Stephani, 1900-24.
R. cordata Mitt. C, Stephani, 1900-24.
R. javanica Gott. Kusaie (Ualan) (C), Gottsche *et al.*, 1845, Schiffner, 1898, Hattori, 1951; Y, Stephani, 1902; P, Inoue, 1959.
R. novae-guineae St. P, Inoue, 1959.
R. nymanii St. P, Inoue, 1959.
Riccardia fuscescens (St.) Andrews? Arno (Ms), Andrews, 1951.
R. multifida (L.) S. F. Gray. Arno (Ms), Miller, 1953.
R. platyclada Schiffn. P, Inoue, 1959.
Spruceanthus polymorphus (Sande) Verd. Hahajima (B), Horikawa, 1954.
Taxilejeunea umbilicatus (Nees) Spr. M, Gottsche *et al.*, 1845, as *Omphalanthus*.
Thysananthus comosus Lindenb. Ponape (C), Glassman, 1952.

In addition to the above, unidentified species have been reported for *Acrobolbus, Anthoceros, Bazzania, Drepanolejeunea, Frullania, Lejeunea, Lopholejeunea, Microlejeunea, Radula, Rectolejeunea, Riccardia,* and *Symphyogyna.*

Bibliography

Some of the publications listed are not cited above but are unquestionably germane to the study of Micronesian bryophytes.

Andrews, A. L. 1951. Mosses and hepatics from Arno Atoll, Marshall Is., 1950. *In* Stone, The Soils of Arno Atoll, Marshall Islands. Atoll Res. Bull. 5: 56.

Bartram, E. B. 1939. Mosses of the Philippines. Philipp. Jour. Sci. 68: 1-423. Pl. 1-29.

———. 1945. Pacific outpost mosses. The Bryologist 48: 45-53.

Bescherelle, E. 1895. Florule bryologique de Tahiti et des îles de Nukahiva et Mangareva. Ann. Sci. Nat. 7, Bot. 20: 1-62.

Bory de Saint-Vincent, J. B. M. 1827-29. Voyage autour du monde . . . sur la corvette . . . la Coquille . . . 1822 . . . 1825 . . . L. I. Duperrey. Botanique. Cryptogamie. Pp. 1-300. Pl. 1-39.

BROTHERUS, V. F. 1902. Laubmoose. *In* Volkens, Die Vegetation der Karolinen, mit besonderer Berüchsichtigung der von Yap. Engler's Bot. Jahrb. 31: 450-453.

———. 1924-25. Musci. *In* Engler & Prantl, Die natürlichen Pflanzenfamilien. Ed. 2. Vol. 10, 11. Leipzig.

DIXON, H. N. 1927. Gilbert Islands mosses. Jour. Bot. 65: 254-257.

———. 1928. *Splachnobryum pacificum* Dixon sp. nov. Rev. Bryol. 1: 12.

———. 1943. War zone mosses. The Bryologist 46: 14-22.

FLEISCHER, M. 1900-22. Die Musci der Flora von Buitenzorg. 4 vol. Leiden.

GAUDICHAUD, C. 1828. Voyage autour du monde . . . sur les corvettes de S. M. l'Uranie et la Physicienne . . . 1817, . . . 1820 . . . Botanique (Hepaticae et Musci). Pp. 215-230. Paris.

———. 1846. Voyage autour du monde . . . sur la corvette la Bonite. Botanique . . . Cryptogames . . . Pp. i-xi; 1-355. Paris.

GLASSMAN, S. F. 1952. List of non-vascular plants from Ponape, Caroline Islands. Amer. Midl. Nat. 48: 735-740.

GOTTSCHE, C. M., J. B. G. LINDENBERG & C. G. NEES AB ESENBECK. 1844-47. Synopsis Hepaticarum. Pp. i-xiv; 1-835. Hamburg.

HATTORI, S. 1951. On a small collection of Hepaticae from Dutch New Guinea. Bot. Mag. Tokyo 64: 112-119.

HORIKAWA, Y. 1929-30. Studies on the Hepaticae of Japan. II-III. Sci. Rpt. Tohoku Imp. Univ. 4, 4: 395-429. Fig. 1-15. Pl. 16-18. (1929); 5: 623-650. Fig. 1-13. Pl. 21-23. (1930).

———. 1931. Studies on the Hepaticae of Japan. IV. Jour. Sci. Hiroshima Univ. Ser. B., Div. 2, 1: 13-35. Fig. 1-10. Pl. 1-2.

———. 1934. Monographia Hepaticarum Australi-Japonicarum. *Ibid.* 101-325. Fig. 1-63. Pl. 11-21.

———. 1934a-35a. Symbolae florae bryophytae Orientali-Asiae II, V, VII. Bot. Mag. Tokyo 48: 599-609. Fig. 1-5. (1934); 49: 211-221. (1935); 49: 671-678. Fig. 26-31. (1935).

———. 1935b-36. Contributions to the bryological flora of eastern Asia II, V. Jour. Jap. Bot. 11: 499-508. Fig. 3-7. (1935); 12: 666-673. Fig. 11-12. (1936).

———.1936a-b. Symbolae florae bryophytae Orientali-Asiae et Micronesiae IX-X. Bot. Mag. Tokyo 50: 380-385. Fig. 33-35, 556-561.

———. 1949. Extension of range for some species of bryophytes. Jour. Jap. Bot. 24: 140-144.

———. 1950-51. Symbolae florae bryophytae Orientali-Asiae et Micronesiae. XI-XII. Hikobia 1: 30-36. Fig. 19. (1950); 1: 78-100. (1951).

———. 1951a-54. Tropical bryophytes in the Japanese Archipelago. I-III. Jour. Sci. Hiroshima Univ. Ser. B. Div. 2, 6: 27-38. 1 map. (1951); 63-103. Maps 2-26. (1952); 273-279. Maps 27-32. (1954).

INOUE, H. 1959. Hepatics from Isl. Palau, Caroline. Jour. Jap. Bot. 34: 267-271. Fig. 1.

LEHMANN, J. G. C. 1838. Novarum et Minus Cognitarum Stirpium. Pugillus 7. Pp. i-iv; 1-41. Pl. 1. Hamburg.

MERRILL, E. D. & E. H. WALKER. 1947. A botanical bibliography of the islands of the Pacific . . . subject index . . . Contr. U. S. Nat. Herb. 30: 1-404.

MERTENS, K. H. 1835. Notices (botaniques) sur les iles Carolines. *In* Luetke, Voyage autour du monde . . . sur la corvette la Séniavine. 3: 132-144; 337-352.

MILLER, H. A. 1955. Bryophytes collected by F. R. Fosberg in the Marshall Islands. Atoll Res. Bull. 40: 1-4.

———. 1956. Cryptogams of Kapingamarangi Atoll, Caroline Islands I: Bryophyta. The Bryologist 59: 167-173.
——— & M. S. Doty. 1953. Bryophytes from Arno Atoll, Marshall Islands. Atoll Res. Bull. 25: 1-10.
Montagne, J. F. C. 1856. Sylloge Generum Specierumque Cryptogamarum . . . Pp. i-xxiv; 1-499. Paris.
Moul, E. T. 1957. Preliminary report on the flora of Onotoa Atoll, Gilbert Islands. Atoll Res. Bull. 57: 1-48.
———. 1958. The bryophytes and lichens of Onotoa, Gilbert Islands. The Bryologist 61: 370-373.
Müller, C. 1848-51. Synopsis Muscorum Frondosorum Omnium Huiusque Cognitorum. 2 vol. Berlin.
Roth, G. 1912. Übersicht über die Gattung *Calymperes*. Hedwigia 51: 122-134.
Sachet, Marie-Hélène & F. R. Fosberg. 1955. Island bibliographies. Micronesian botany . . . Nat. Acad. Sci.–Nat. Res. Counc. Publ. 335. Pp. i-v; 1-577. Washington.
Sakurai, K. 1943. Bryoflora von Micronesia. I-II. Bot. Mag. Tokyo 57: 86-92. Fig. 1-14; 249-257. Fig. 1-19.
Schiffner, V. 1898. Conspectus Hepaticarum Archipelagi Indici. Pp. 1-382. Batavia.
Schwaegrichen, F. 1811-42. Supplements to Hedwig, Species Muscorum Frondosorum . . . Leipzig.
Stephani, F. 1900-24. Species Hepaticarum. 6 vol. Geneva.
———. 1902. Lebermoose. *In* Volkens, Die Vegetation der Karolinen, mit besonderer Berücksichtigung der von Yap. Engler's Bot. Jahrb. 31: 450.
Sullivant, W. S. & L. Lesquereux. 1859. Characters of some new Musci collected by Charles Wright in the North Pacific Exploring Expedition . . . Proc. Amer. Acad. Arts & Sci. 4: 275-282.
Taylor, W. R. 1950. Plants of Bikini. Pp. 1-218. Pl. 1-78. Univ. Michigan Press. Ann Arbor.
Trevisan, V. 1877. Schema di una nuova classificazione delle epatiche. Mem. del R. Ist. Lomb. 3, 4: 383-451.
Verdoorn, F. 1930. Die Frullaniaceae der indomalesischen Inseln (De Frullaniaceis VII). Ann. Bryol. Suppl. 1: 1-187. Fig. 1-304.
———. 1930a. Revision der von Ozeanien angeführten Frullaniaceae (De Frullaniaceis VIII). Nederl. Kruidk. Arch. 1930: 155-175.
———. 1934. Revision der von Ozeanien, Australien und Neuseeland angeführten Lejeuneacae Holostipae (De Frullaniaceis XIV). Blumea 1: 216-240.
———. 1934a. Die Lejeuneaceae Holostipae der Indomalaya . . . (De Frullaniaceis XV). Ann. Bryol. Suppl. 4: 40-192.

RECENT LITERATURE ON HEPATICS

Margaret Fulford[1]

Allorge, Valia & Suzanne Jovet-Ast. La distribution des Marchantiales dans la Péninsule Ibérique et au Maroc. Inst. Biol. Applicada 27: 130-145. 12 maps. 1958.

[1] Dept. of Biological Sciences, University of Cincinnati, Cincinnati 21, Ohio.

AMAKAWA, T. *Calypogeia* in Mt. Hiko and its oil-bodies. Misc. Bryol. et Lichen. 18: 4-5. figs. 1958. [Japanese]

———. Family Jungermanniaceae of Japan. I. Jour. Hattori Bot. Lab. 21: 249-288. 10 fig. 3 pl. 1959. [History, family characters, etc.; new: *Cryptocoleopsis* gen. n., *C. imbricata* sp. n., *Nardia scalaris* ssp. *harae* (Amak.) c. n., *N. hiroshii* sp. n.]

ANDO, H. Ecological notes on the *Porella vernicosa* complex. Hikobia 2(1): 45-52. 2 fig. 2 tab. 1960. [Japanese with German summary; new; *P. vernicosa* ssp. *gracillima* (Mitt.) stat. nov.]

BHARDWAJ, B. C. Studies in Indian Anthocerotaceae. II. The morphology of *Anthoceros* cf. *gemmulosus* (Hattori) Pande. Jour. Indian Bot. Soc. 37(1): 75-92. 2 pl. 42 fig. 1958.

CASTELL, C. P. New vice-county records. Hepaticae. Trans. Brit. Bryol. Soc. 3(4): 626-630. 1959.

CASTLE, H. A revision of the genus *Radula*. Part II. Subgenus Acroradula. Section 3. Dichotomae. Jour. Hattori Bot. Lab. 21: 1-52. 22 fig. 1959. [New: *R. loriana* sp. n., *R. elliottii* sp. n., *R. wrightii* sp. n., *R. obovata* sp. n., *R. varilobula* sp. n., *R. opaciuscula* (Spruce) c. n., *R. lindgii* sp. n., *R. neotropica* sp. n., *R. pagani* sp. n., *R. microlobula* sp. n., *R. undertwoodii* sp. n., *R. husnotii* sp. n., *R. antilleana* sp. n.]

———. A revision of the genus *Radula*. Part II. Subgenus Acroradula. Section 4. Marginatae. Rev. Bryol. et Lichén. 28 (3/4): 290-296. 2 fig. 1959 (1960).

CLARK, LOIS. *Frullania laxiflora*. Bryologist 62(2): 135-138. 17 fig. 1959.

———. *Frullania tenera*. Bryologist 63(3): 190-193. 18 fig. 1959 (1960).

CRUM, H. Review: Jerzy Szweykowski, "Prodromus Florae Hepaticarum Poloniae." Bryologist 62(3): 195. 1959 (1960).

DUDA, J. *Metzgeria simplex* Lorbeer in der Tschechoslowakei. Preslia 31(4): 425-428. 1959. [Czech with German summary]

FULFORD, MARGARET. Hepaticae. *In* T. Yuncker, Plants of Tonga. Bernice P. Bishop Mus. Bull. 220: 1-283. 17 fig. 1959. [Hepatics on p. 18]

———. Studies on American Hepaticae. 7-8. A supplement to "The genus *Bazzania* in Central and South America." I-II. Bull. Torrey Bot. Club 86(5): 308-341. Fig. 1-78. 1959. [New: *B. serrata* sp. n., *B. sublonga* sp. n., *B. elongata* sp. n., *B. crassidentata* sp. n.; and additional synonymy and corrections]

———. Studies on American Hepaticae. 9-11. A supplement to "The genus *Bazzania* in Central and South America" (continued). *Ibid.* 86(6): 394-412. Fig. 79-113. 1959. [New: *B. schlimiana* (Gottsche) c. n., *B. boliviana* (Steph.) c. n., *B. macrostipula* sp. n., *B. heterostipa* (Steph.) c. n.; and additional synonymy and corrections]

——— & JANE TAYLOR. The segregate genera of the *Lepidozia* complex (Hepaticae). Part I. *Sprucella* Steph. and *Neolepidozia* gen. nov. Brittonia 11(2): 77-85. 41 fig. 1959. [New: *Sp. ubangiensis* (Steph.) c. n., *Neolepidozia* gen. n., *N. capilligera* (Schwaegr.) c. n., *N. oligophylla* (Lehm. & Lindenb.) c. n., *N. tetradactyla* (Hook. & Tayl.) c. n., *N. wallichiana* (G.) c. n., *N. centipes* (Tayl.) c. n., *N. gottscheana* (Lindenb.) c. n., *N. clatritexta* (Steph.) c. n., *N. grossiseta* (Steph.) c. n., *N. roscana* (Steph.) c. n., *N. corticola* (Steph.) c. n., *N. papulosa* (Steph.) c. n., *N. cuneifolia* (Steph.) c. n., *N. disticha* (Steph.) c. n., *N. gunniana* (Steph.) c. n., *N. husnoti* (Steph.) c. n., *N. parvifolia* (Steph.) c. n.]

——— & ———. *Psiloclada* and the species of *Microlepidozia* with succubous leaves. Jour. Hattori Bot. Lab. 21: 79-84. 22 fig. 1959. [New: *M.*

reversa (Carr. & Pears.) c. n., *M. lateconica* (Steph.) c. n., *M. brasiliensis* (Steph.) c. n., *M. uleana* (Steph.) c. n.]

——— & ———. Terminal branching in *Lepidozia granatensis* Gottsche. Rev. Bryol. et Lichén. 28(3/4) : 276-279. 4 fig. 1959 (1960).

Grolle, R. Beitrag zur Kenntnis der afrikanischen Lophocoleen. Trans. British Bryol. Soc. 3(4) : 582-598. 3 tab. 1959. [New: *Lophocolea fasciculata* (Nees) S. Arn. & Grolle c. n., *L. subintegra* (H. f. & T.) Grolle c. n., *L. bewsii* (Sim) Grolle c. n.]

———. *Lophozia* (Massula) *patagonica* Herzog & Grolle n. sp. Rev. Bryol. et Lichén. 28(3/4) : 343-345. 1 fig. 1959 (1960).

———. Über *Herpocladium fissum* Mitt. Ein Nachtrag zu "Was ist *Pachyglossa*." *Ibid.* 28(3/4) : 346-350. 1 fig. 1 map. 1959 (1960).

Halbsguth, W. Ueber den Einfluss von Phalloidin auf die Geoinduktion bei Brutkörpern von *Marchantia polymorpha*. Biol. Zentralbl. 77(5) : 557-580. 1958.

Hara, M. Revision of the family Jungermanniaceae in Shikoku, southern Japan. II. Research Rept. Kochi Univ. [Japan] 6(13) : 1-9. 4 fig. 1957. [New: *Nardia emarginata* sp. n.]

———. Revision of the family Jungermanniaceae in Shikoku, southern Japan. III. *Ibid.* 7 (12) : 1-21. 9 fig. 1958. [New: *Plectocolea riparia* sp. n.]

Hässel de Menéndez, G. G. Sobre el hallazgo del género *Riella* en Sudamérica. Rev. Bryol. et Lichén. 28(3/4) : 297-299. Pl. 18-19. 1959 (1960).

Hattori, S. *Takakia*, a new taxon of Hepaticae. Proc. IX Intern. Bot. Congress, Montreal 2 : 153. 1959.

———. Hepaticae of Mt. Hakusan, Middle Japan. Jour. Hattori Bot. Lab. 21 : 118-131. 1959. [46 genera, 110 sp.]

——— & H. Inoue. Hepaticae of Tanigawa Mountains with special reference to its summit serpentine vegetation. *Ibid.* 21 : 85-103. 1959. [New: *Cephalozia bicuspidata* ssp. *otaruensis* (Steph.) c. n.]

——— & ———. Hepaticae of Shirouma mountains, Middle Japan. *Ibid.* 21 : 104-117. 1959. [48 genera, 96 sp.]

——— & M. Mizutani. Marchantiales of Japan. V. [a] A luminous liverwort in Japan [*Cyathodium smaragdinum* Schiffn.] [b] Some synonymy in Japanese *Asterella*, *Mannia* and *Athalamia*. *Ibid.* 21 : 132-137. 2 fig. 1959.

Inoue, H. Studies on spore germination of Hepaticae 5. *Fossombronia japonica* Schiffn. Bot. Mag. Tokyo 72(850) : 131-136. 21 fig. 1959.

———. Contributions to the knowledge of the Plagiochilaceae of southeastern Asia. 1. Two interesting species of *Plagiochila* from Formosa. Jour. Jap. Bot. 34(3) : 91-96. 2 fig. 1959. [New: *P. sawadae* sp. n.]

———. Miscellaneous notes on the hepatics of Japan (1). *Ibid.* 34(6) : 190-192. 6 fig. 1959. [Notes on *Lophozia heterocolpa*, *Scapania ornithopodioides*, *Pleurozia purpurea*]

———. Miscellaneous notes on Hepaticae of Japan (2). *Ibid.* 34(7) : 209-210. 1 fig. 1959. [New: *Porella oblongifolia* fo. *chichibumontana* (Inoue) stat. n., *P. macroloba* (Steph.) Hattori et Inoue c. n.]

———. Hepatics from Isl. Palau, Caroline. *Ibid.* 34(9) : 267-271. 1 fig. 1959. [New: *Acromastigum palauense* sp. n., *Bazzania watanabei* sp. n., *Cheilolejeunea bidentula* (Steph.) comb. n.]

———. A review of Japanese species of *Lophocolea* Dum. Jour. Hattori Bot. Lab. 21 : 214-230. 6 fig. 1959. [New: *L. nakajimae* Hatt. et Inoue sp. n.]

———. On *Metacalypogeia*, a new genus of Hepaticae. *Ibid.* 21 : 231-235. 2 fig. 1959. [New: *Metacalypogeia* (Hatt.) gen. n., *M. cordifolia* (Steph.) c. n., *M. montana* (Horik.) c. n.]

———. Notes on two hepatics from Mt. Kai-Koma. Misc. Bryol. et Lichen. 18: 2-3. 1958. [Japanese]

———. Key to the Japanese species of *Lophocolea*. *Ibid.* 20: 4-5. 1959. [Japanese]

———. New habitats of some hepatics, 3. *Ibid.* 21: 2-3. 1959. [Japanese]

JONES, E. W. Review: K. Müller, Die Lebermoose Europas. *In* Rabenhorst's Krytogamenflora von Deutschland, Oesterreich, und der Schweiz. Band VI. 3rd ed., pt. 9. Pp. 1221-1316, text figures 473-514. 1957. Leipzig: Akad. Verlagsgesell. Geest & Portig. DM 22. Trans. Brit. Bryol. Soc. 3(4): 612-613. 1959.

———. *Lophozia perssonii* Buch and Arnell in the Jura. Rev. Bryol. et Lichén. 28(3/4): 353-354. 1959 (1960).

KACHROO, P. Hepaticae of Bengal. I. Sporeling germination and taxonomy of *Riccia pimodii* sp. nov. from Burdwan. Jour. Indian Bot. Soc. 38(2): 213-220. 25 fig. 1959.

———. A history of the genus *Pycnolejeunea* (Spr.) Schiffner. *Ibid.* 38(3): 332-337. 1959 (1960).

KEIL, M. [Ein Beitrag zur Physiologie der Gattung *Riccia*]. Preslia 31(1): 26-33. Pl. 1-7. 1959. [Czech with German summary]

———. [Unknown forms of branching in the genus *Riccia*]. *Ibid.* 31(4): 381-384. Pl. 22-23. 1959. [Czech with English summary]

KNAPP, E. Meiotic segregation in green plants. Proc. IX Intern. Bot. Congress, Montreal 2: 195. 1959. [*Sphaerocarpus*].

KUWAHARA, Y. Key to the Japanese species of *Calypogeia*. Misc. Bryol. et Lichen. 19: 1. 1959. [Japanese]

———. Note on the distribution of Japanese *Metzgeria*. *Ibid.* 19: 1-2. 1959. [Japanese]

——— & H. A. MILLER. Taxonomy and Asiatic affinities of *Metzgeria* and *Calypogeia*. Proc. IX Intern. Bot. Congress, Montreal 2: 212. 1959.

LUNDBLAD, BRITTA. 4. Rhaeto-Liassic floras and their bearing on the stratigraphy of Triassic-Jurassic rocks. Acta Univ. Stockholm.—Stockholm Contr. Geology 3(4): 83-102. 1959. [Hepatics included]

———. On *Ricciisporites tuberculatus* and its occurence in certain strata of the "Höllviken II" boring in S. W. Scania. Grana Palynol. 2(1): 1-10. 2 fig. 1 pl. 1959.

MANTON, IRENE. The fine structure of plant cytoplasm at various stages in an active meristem. Proc. IX Intern. Bot. Congress, Montreal 2: 251. 1959. [*Anthoceros*]

MEHRA, P. N. Cytological investigations on some Marchantiales of the western Himalayas and Panjab Plain. Proc. IX Intern. Bot. Congress, Montreal 2: 259. 1959.

——— & R. S. PATHANIA. Chromosome numbers in some western Himalayan acrogynous Jungermanniales. Bryologist 62(4): 242-247. 6 fig. 1959 (1960).

MEIJER, W. On some south-east Asiatic species of the genus *Plectocolea*. Jour. Hattori Bot. Lab. 21: 53-60. 5 fig. 1959. [5 species; new: *P. tetragona* (Lindenb.) c. n.]

———. Notes on species of *Riccardia* from their type localities in western Java. *Ibid.* 21: 61-78. 11 fig. 1959. [18 species discussed]

MILLER, H. & EDITH SCOTT. Notes on Hawaiian Hepaticae. III. Relationships among *Herpocladium*, *Herberta* and *Acromastigum*. Bryologist 62(2): 109-116. 3 fig. 1959.

MIZUTANI, M. On the fragmentation of leaves of *Plagiochila yokogurensis* and *Porella*. Misc. Bryol. et Lichen. 18: 3-4. Fig. A-C. 1958. [Japanese]

———. *Cyathodium smaragdinum* in Japan. *Ibid.* 19: 2-3. Fig. A-C. 1959.

———. On some little known species of *Lophocolea* (Hepaticae) from the Southern Hemisphere. Jour. Jap. Bot. 34(6): 167-173. 2 fig. 1959.

PROSKAUER, J. Phylogeny of the Anthocerotales: spiral thickenings in the columella. Proc. IX Intern. Bot. Congress, Montreal 2: 311. 1959.

SCHUSTER, R. M. Notes on nearctic Hepaticae. VI. Phytogeographic relationships of critical species in Minnesota and adjacent areas of the Great Lakes. Rhodora 60: 209-234; 243-256. 18 maps. 1958.

———. Evolution in the Ptilidiinae. Proc. IX Intern. Bot. Congress, Montreal 2: 350. 1959.

———. A monograph of the nearctic Plagiochilaceae. I. Introduction and Sectio I. Asplenioides. Amer. Midland Nat. 62(1): 1-166. 14 fig. 1 tab. 1959. [New: *Anomylia* gen. n., *A. cuneifolia* (Hook.) c. n., *P. asplenioides* var. *obcampanulata* n. v., *P. arctica* var. *intermedia* n. v.]

———. A monograph of the nearctic Plagiochilaceae. Part II. Sectio Zonatae through Sectio Parallelae. *Ibid.* 62(2): 257-395. Fig. 15-42. 1959. [New: *Plagiochila semidecurrens* ssp. *grossidens* (Herz.) n. c., *P. sharpii* ssp. *yakusimensis* (Hattori) c. n., *P. verruculosa* sp. n., *P. lophophora* sp. n., *P. sullivantii* var. *spinigera* v. n., *P. austini* fo. *stenophylla* fo. n., *P. echinata* sp. n., *P. japonica* ssp. *ciligera* ssp. n., *P. rhizophora* ssp. *confusa* ssp. n., *P. yokogurensis* ssp. *fragilifolia* ssp. n.].

———. A monograph of the nearctic Plagiochilaceae. Part. III. Sectio Contiguae to Conclusion. Amer. Midland Nat. 63(1): 1-130. Fig. 43-71. 1960. [New: *P. virginica* var. *caroliniana* v. n. and var. *euryphylla* v. n., *P. dubia* var. *integrifolia* v. n., *P. asplenifórmis* sp. n., *P. ludoviciana* var. *invisus* v. n., *P. miradorensis* var. *convoluta* v. n., *P. undata* ssp. *crispata* (Gottsche) c. n.]

———. Hepaticae, *in* Schuster, Steere, & Thomson, The terrestrial cryptogams of northern Ellesmere Island. Nat. Mus. Canada Bull. 164: 15-71. 1959. [New: *Blepharostoma trichophyllum* ssp. *brevirete* (Bryhn & Kaalaas) c. n., *Lophozia floerkei* var. *hyperborea* v. n., *L. kunzeana* var. *rotundiloba* v. n., *Eremonotus* (Sphenolobus) *minutus* (Cr.) c. n., *Solenostoma polaris* (Berggr.) c. n., *S. polaris* fo. *cavifolius* fo. n.]

SCOTT, EDITH B. & H. MILLER. Notes on Hawaiian Hepaticae. IV. *Herberta herpocladioides* sp. nov. Bryologist 62(2): 116-118. 1 fig. 1959.

SEKI, T. New localities of *Frullania nodulosa* (R. Bl. N.) Nees in Japan. Hikobia 2(1): 8. 1960.

DE SLOOVER, J. Considerations sur la valeur specifique de *Moerkia flotoviana* (Nees) Schiffn., Dilaenaceae nouvelle pour la flore Belge. Jard. Bot. de l'État Bull. 29(2): 157-181. Fig. 26-30. 1959.

SOBOTKA, D. Nouvelle localité de *Riccia rhenana* Lorbeer en Pologne. Frag. Florist. et Geobot. 4(1/2): 221-224. 7 fig. 1958.

STANGE, LUISE. About correlations between differently regenerating cells in *Riella*. Proc. IX Intern. Bot. Congress, Montreal 2: 376. 1959.

SVIHLA, RUTH D. The female inflorescence of *Frullania picta*. Bryologist 62(3): 193-195. 10 fig. 1959 (1960).

SZWEYKOWSKI, J. Hepaticotheca Polonica. Fasc. VII. Nos. 150-175. Academia Scientiarum Poloniae. Poznań. 1957.

———. Hepaticotheca Polonica. Fasc. VIII. Nos. 176-200. Academia Scientiarum Poloniae. Poznań. 1958.

———. The variation of *Orthocaulis atlanticus* in Europe. Proc. IX Intern. Bot. Congress, Montreal 2: 391. 1959.

———. The liverwort flora of the Tatry Mountains. Poznań Soc. Friends Sci., Sect. of Math. & Nat. Sci. No. 2. 1959.

TAYLOR, JANE. Terminal branching in the Lepidoziaceae. Proc. IX Intern. Bot. Congress, Montreal 2a: 37-38. 1959.

WILLIAMS, H. & R. F. CAIN. Additions to the Hepaticae of Ontario. Bryologist 62(2): 145-148. 1959. [36 species added to the list, with additional records for 39 of the more significant species]

RECENT LITERATURE ON LICHENS—33[1]

WILLIAM L. CULBERSON[2]

ABBAYES, H. DES. L'aire géographique de *Cladonia mediterranea* Duv. et des Abb. (Lichens) et son écologie d'après de nouvelles observations. Rev. Bryol. et Lichénol. 28(3-4): 355-358. 1 map. (1959) 1960.

AGHORAMURTHY, K., K. G. SARMA & T. R. SESHADRI. The structure of thelephoric acid. Tetrahedron Letters [London] 1959(8): 20-24. 1959. [From *Lobaria* sp.]

AHMADJIAN, V. A botanical adventure in Swedish Lapland. Carolina Tips [Elon College, North Carolina] 23(3): 9-10. illus. 1960. [Popular article with mention of lichens.]

ANDERSON, R. Report on the genus *Cladonia* in a Minnesota township. Proc. South Dakota Acad. Sci. 37: 101. 1958. [8 taxa from Hubbard Co.; abstract.]

ANONYMOUS. Dr. A. W. Evans. Misc. Bryol. et Lichenol. 2(1): 10-11. 1 portrait. 1960. [Necrology. In Japanese.]

ASAHINA, Y. Lichen and bryophyte specimens collected by Siebold and his contemporaries in Japan. Bull. Natl. Sci. Mus. [Tokyo] No. 45: 374-387. Pl. 61-74. 1959. [64 lichens, 11 bryophytes.]

———. Lichenologische Notizen (§ 157-159). Jour. Jap. Bot. 34(11): 347-350. 2 fig. 1959. [New: *Cladonia heteroclada* n. sp., *C. carassensis* subsp. *japonica* (Vain.) n. c., *C. pseudohondoensis* n. sp.]

BANHEGYI, J. Dr Ödön Szatala (1889-1958). Rev. Bryol. et Lichénol. 28(1-2): 239-242. Pl. 17. 1959. [Necrology, bibliography and portrait.]

[BARKHALOV, S. O.][3] [Preliminary list of the lichens of Talysh.] [Trudy Inst. Bot. Akad. Nauk Azerbaidzhan SSR] 20: 33-63. 1957. [176 ssp.]

BERNER, L. La limite forestière. Feddes Repertorium, Beiheft 138: 151-161. 10 fig. 1959. [9 spp. (fig. 10).]

BIBBY, P. Some lichens collected in Arnhem Land. P. 169 *in* R. L. Specht & C. P. Mountford, "Records of the American-Australian Scientific Expedition to Arnhem Land. 3. Botany and Plant Ecology." xv + 522 pp. illus. Melbourne University Press. Melbourne. 1958. [3 spp.]

BOULY DE LESDAIN, [M.] Quelques nouveaux lichens. Rev. Bryol. et Lichénol. 28 (3-4): 359-360. (1959) 1960. [New: *Xanthoria scandinavica* n. sp., *Ramalina pulchella* n. sp., *R. farinacea* v. *gracilenta* f. *colorata* n. f., *Cetraria aculeata* f. *dendroidea* n. f. The last two are nom. nud.]

BRIGHTMAN, F. H. Some factors influencing lichen growth in towns. The Lichenologist 1(3): 104-108. 3 tab. 1959. [The high water-absorbing power and high base content of tiles favors the growth of lichens on roofs in a London suburb.]

[1] Names of new taxa from the Americas are marked with an asterisk (*).

[2] Department of Botany, Duke University, Durham, N. C.

[3] Names and title transliterated and translated respectively from the Russian.

———. Lichen weekend at Flatford. *Ibid.* 1(3) : 119. 1959.

CAPRIOTTI, A. The effects of "Usno" on yeasts. 1st note. Giorn. di Microbiol. [Milano] 7(3) : 187-206. 3 tab. 1959. [The commercial usnic acid derivative "Usno" strongly inhibits the growth of yeasts.]

CLAUZADE, G. & Y. RONDON. Aperçu sur la végétation [lichénique] alpine dans la région du Lautaret et du Galibier. Rev. Bryol. et Lichénol. 28(3-4) : 361-399. (1959) 1960. [About 350 spp.]

CURTIS, J. T. The Vegetation of Wisconsin. An Ordination of Plant Communities. xi + 657 pp. 53 fig. 66 pl. 30 tab. University of Wisconsin Press. Madison. 1959. [Lichens: pp. 118, 144, 195, 209-210, 216, 234, 309-310.]

DAHR, M. L., S. NEELAKANTAN, S. RAMANUJAM & T. R. SESHADRI. Chemical investigation of Indian lichens: Part XXII. Jour. Sci. & Indus. Res. [New Delhi] 18B(3) : 111-113. 1959. [Components of 15 spp.]

DJERASSI, C., JEANNE OSIECKI & W. CLOSSON. Optical rotatory dispersion studies. XXV. Effect of carbonyl groups in pentacyclic triterpenes. Jour. Amer. Chem. Soc. 81(17) : 4587-4600. 9 fig. 1959. [Zeorinone, p. 4600.]

DUDDINGTON, C. L. Lichens and their uses. New Scientist [London] 5(116) : 293-295. 2 fig. 1959. [Popular article.]

DUNCAN, U[RSULA] K. *Lecanora andrewii* B. de Lesd. in east Scotland. The Lichenologist 1(3) : 111-112. 1959.

FAUREL, L. & G. SCHOTTER. Notes lichénologiques. I. Sur deux lichens nouveaux pour le Maroc. Bull. Soc. des Sci. Nat. & Phys. du Maroc 37 : 225-237. 3 fig. 1957. [*Epiphloea terrena* (Nyl.) Trev. and *Cladonia mediterranea* Duv. & des Abb.]

———. & ———. Lichens. Pp. 67-79, 12 fig. *in* P. Quézel, "Mission Botanique au Tibesti." [Univ. d'Alger, Inst. de Recherches Sahariennes]. Reprints not dated. [32 spp. New: *Endocarpon quezelii* n. sp., *Catillaria lutosella* n. sp., *Protoblastenia basaltica* n. sp., *Buellia* (Catolechia) *tibestica* n. sp.]

FOLLMANN, G. Die farbphotographische Aufnahme von Flechtenbeständen und Flechtengesellschaften. Photographie & Forsch. [Zeiss Ikon AG. Stuttgart] 8(2) : 53-57. 12 colored fig. 1959.

FREY, E. Beiträge zu einer Lichenenflora der Schweiz I. Ber. der Schweiz. Bot. Gesell. 69: 156-245. 15 fig. 3 pl. 1959. [Keys to the Swiss Cladoniaceae and Parmeliaceae. New: *Parmelia cetrarioides* v. *sorediata* (Schaer.) n.c.]

GALLÉ, L. Antibiotikumok zuzmókban. [Antibiotics from lichens.] Élövilág [Budapest] 4(4) : 20-23. illus. 1959. [Semipopular article.]

———. A *Physcia biziana* (Mass.) A. Zahlbr. mediterrán zuzmófaj alakköre és magyarországi elöfordulása. [L'habitat en Hongrie et relations systématiques du lichen méditerranéen *P. b.*] Bot. Közlemények 48(1-2) : 48-51. 6 fig. 1959. [New: *P. b.* v. *granuligera* (Zahlbr.) n.c., v. *pulvinata* (Zahlbr.) n.c., terat. *excrescens* n. terat.]

[GOLUBKOVA, N. S.][3] [An outline of lichenoflora of the Moscow region and the adjoining districts.] [Bot. Zhurnal] [Moscow] 44(2) : 153-161. 1959. ["Six ecological groups of lichens have been distinguished inhabiting different substrata. A total of 340 species, 125 varieties and forms have been studied."—English summary.]

GROVER, P. K. & T. R. SESHADRI. Chemical investigation of Indian lichens: Part XXIII—Imperfect lichens. Jour. Sci. & Indus. Res. [New Delhi] 18B(6) : 238-240. 1959. [5 spp.]

HALICZ, B. Badania statystyczno-florystyczne nad rozmieszczeniem nadrzewnych porostów okolic Łodzi. Łódzkie Towarzystwo Nauk. [Soc. Sci. Lodziensis] Sect. III. Nr. 60. 40 pp. 10 tab. 1959. [Statistical study of corticolous lichens; many spp. In Polish.]

HANNA, L. A. Some common lichens of southeastern Montana. Proc. Montana Acad. Sci. 18: 11-12. (1958) 1959. [6 spp. from Custer Co.]

HESS, D. Untersuchungen über die Bildung von Phenolkörpern durch isolierte Flechtenpilze. Zeitschr. für Naturforsch. [Tübingen] 14b(5): 345-347. 1 tab. 1959. [Studies on 7 spp.]

HOSOKAWA, T. & M. OMURA. On a brief study of community dynamics of epiphytes. Mem. Fac. Sci., Kyushu Univ., Ser. E (Biol.), 3(1): 43-50. 9 tab. 1959. [20 lichens, 12 bryophytes.]

IVIMEY-COOK, R. B. The lichens of the Ewenny Downs, Glamorganshire. The Lichenologist 1(3): 97-103. 1959. [The effect of exposure and shade on the composition of rock- and soil-inhabiting lichen vegetations and of various barks on that of corticolous vegetation.]

JAMES, P. W. New British records. *Ibid.* 1(3): 113-114. 1959. [14 spp.]

JONES, R. J. Lichen hyphae in limestone. *Ibid.* 1(3): 119. 1959. [A method for demonstrating the penetration of hyphae into limestone.]

[KUPREVICH, V. F. & E. N. MOISEEVA.][3] [Extracellular enzymes of lichens.] [Akad. Nauk SSSR. Doklady] 115(6): 1138-1141. 1 fig. 1 tab. 1957. [Enzymes of 7 spp. In Russian.]

LAMB, I. M. La vegetación liquénica de los Parques Nacionales Patagónicos. An. de Parques Nacionales [Buenos Aires] 7: 1-188. 13 fig. 10 colored plates. 1958. [A flora treating many spp., especially of macrolichens. Keys. New: *Pseudocyphellaria horrida* (Hue) n.c., P. *albidopallens* f. *albosticta* (Räs.) n.c., P. *impressa* v. *lorifera* (Stirt.) n.c.; *Sticta marginifera* v. *ochraceofusca* (Räs.) n.c.; *Nephroma gyelnikii* (Räs.) n.c.; *Peltigera canina* v. *aloisii* (Gyel.) Thomson n.c. and f. *inaequalis* (Gyel.) Thomson n.c.; *Stereocaulon patagonicum* f. *reagens* (Räs.) n.c., v. *violascens* (Müll. Arg.) n.c. and v. *depressum* (Magn.) n.c.; *Umbilicaria patagonica* (Räs.) n.c.; *Anzia anzioides* (Darb.) n.c.; *Usnea aurantiacoatra* f. *strigulosa* (Zahlbr.) n.c., *U. rohmederi* (Lamb) n.c.]

MAYO, P. DE. The Higher Terpenoids. vii + 239 pp. Interscience Publishers, Inc. New York. [Chemistry of Natural Products. Vol. III]. 1959. [Ursolic acid: pp. 166, 168.]

MOTYKA, J. Odkrycie *Alectoria tortuosa* Merrill w Karpatach Wschodnich—*Alectoria tortuosa* Merrill in Carpatis Orientalibus inventa. Fragmenta Florist. et Geobot. 3(2): 201-203. 1958.

———. Przegląd krytyczny europejskich i północno-azjatyckich gatunków, odmian i form z rodzaju *Alectoria* Ach., opisanych lub omawianych przez V. Gyelnika—Revisio specierum, varietatum et formarum generis *Alectoria* Ach. a V. Gyelnik descriptarum vel tractatarum, ex Europa et Asia Boreali provenientium. *Ibid.* 3(2): 187-200. 1958. [Of the many European and Asian taxa of *Alectoria* described by Gyelnik, only 5 are good.]

———. Rodzaj *Alectoria* Ach., podrodzaj *Bryopogon* (Link) Th. Fr. w Europie Środkowej (opisy gatunków)—Lichenum genus *Alectoria* Ach., subgenus *Bryopogon* (Link) Th. Fr. in Europa media (descriptiones specierum). *Ibid.* 3(2): 205-231. 1958. [16 spp. Key. New: *A. subprolixa* n. sp., *A. positiva* (Gyel.) n.c., *A. intricans* (Vain.) n.c.]

———. Stanowisko *Alectoria vrangiana* Gyel. w Tatrach—*Alectoria vrangiana* Gyel. in montibus Tatricis inventa. *Ibid.* 4(1-2): 243-244. 1958.

———. Studia systematyczne nad gatunkami rodzaju *Alectoria*—Etudes systématiques des *Alectoria*. *Ibid.* 4(1-2): 229-242. 1958. [New: *A. nadvornikiana* v. *spinulosa* (Ahl.) n.c., v. *extensa* n.v., v. *eciliata* n. v.; *A. sophiae* n. sp.; *A. pellucida* n. sp.; *A. carpatica* n. sp.]

MURTY, T. K. & S. S. SUBRAMANIAN. Chemical components of *Usnea venosa* Mot. Jour. Sci. & Indus. Res. [New Delhi] 18B(9): 394-395. 1959. [Carotene, d-usnic and salazinic acids and ergosterol.]

———. & ———. Isolation of carotene from *Roccella montagnei*. *Ibid.* 18B(4): 162-163. 1959.

———. & ———. Isolation of egosterol from *Roccella montagnei*. *Ibid.* 18B(2): 91-92. 1959.

———. & ———. Carotene from lichens. Res. & Indus. 4(7): 176. 1959. [From *Roccella montagnei*.]

NEELAKANTAN, S., T. R. SESHADRI & S. S. SUBRAMANIAN. Constitution of vicanicin from the lichen *Teloschistes flavicans*. Tetrahedron Letters [London] 1959(9): 1-4. 1959.

OCHSNER, F. Die Bedeutung der Moose in einigen pavesischen Pflanzengesellschaften. Arch. Bot. & Biogeogr. Ital. 34[= 4ª ser. 3(1-2)]: 69-76. 1958. [Several lichens.]

[OKSNER, A. M.][4] [Attainments of native scholars dealing with a thorough study of the lower plants of the Ukrainian SSR.] [Bot. Zhurn., Akad. Nauk Ukraïnskoï RSR, Inst. Bot.] [Kiev] 11(2): 28-35. 1954. [Includes a discussion of lichenology. In Ukrainian.]

OMURA, M. & T. HOSOKAWA. On the detailed structure of a corticolous community analysed on the basis of interspecific association. Mem. Fac. Sci., Kyushu Univ., Ser. E (Biol.), 3(1): 51-63. 8 fig. 1 tab. 1959. [9 lichens, 26 bryophytes.]

PIŠÚT, I. Doplnky k poznaniu lišajníkov Slovenska. Nachträge zur Kenntnis der Flechten der Slowakei. Prírodovedký Sborn. Slov. Múz. [Bratislava] 5: 120-123. 1959. [About 40 spp.]

———. Príspevok k posnaniu lišajníkov Slovenska II. [Beiträg zur Kenntnis der Flechten der Slowakei II.] Acta Fac. Rerum Nat. Universitatis Comenianae, Bot. 3(9-12): 593-597. 1 map. 1959. [Several spp.]

QUISPEL, A. Lichens. Handbuch der Pflanzenphysiol. [Springer-Verlag, Berlin] 11 ["Heterotrophie"]: 577-604. 4 fig. 7 tab. 1959. [Review of symbiosis and physiology of the symbionts. Many references.]

RASSADINA, K. A. De stirpe *Parmeliae caperatae* in URSS notula. Acta Inst. Bot. nomine V. L. Komarovii Acad. Sci. URSS., ser. II, Plantae Cryptogamae 12: 5-17. 3 fig. 1959. [New: *P. ulophyllodes* f. *sorediosa* n.f., f. *straminea* n.f. In Russian.]

RENNERT, A[LDONA] & M. GUBANSKI. Ribonuclease in *Cetraria islandica*. Die Naturwissenschaften 47(1): 18-19. 1 fig. 1960.

RIEDL, H. Kulturversuche zum Pleomorphismus einiger Pyrenomyzeten. Österreich. Bot. Zeitschr. 106(6): 477-545. 14 fig. 1959. ["Untersuchungen an Flechtenpilzen"; *Arthopyrenia fraxini* aff., *Microthelia micula* (Flot.) Kbr., pp. 533-537.]

RIEHMER, E. Beiträge zur Flechtenflora Deutschlands. Sydowia 12(1-6): 210-217. (1958) 1959. [40 taxa. New: *Lecidea* (Biatora) *elegantula* n. sp., *Staurothele isarina* n. sp., *Polyblastia foveolata* n. sp., *Thelidium amethystinum* n. sp. with v. *bornaense* n. v.]

ROBINSON, H. Lichen succession in abandoned fields in the Piedmont of

[4] Names and title transliterated and translated respectively from the Ukrainian.

North Carolina. The Bryologist 62(4): 254-259. 1 fig. (1959) 1960. [Data on 12 *Cladoniae*.]

RONDON, Y. Remarques sur quelques lichens arboricoles au Plateau d'Assy. Cahiers des Naturalistes, Bull. des Naturalistes Parisiens, n. sér. 14: 63-64. 1958. [25 spp.]

SATO, M. Identification of algae occurring as lichen symbiont. Bull. Jap. Soc. Phycol. 7(3): 88-91. 1959. [Short review in Japanese.]

SCHUSTER, R. M., W. C. STEERE, & J. W. THOMSON. The terrestrial cryptogams of northern Ellesmere Island. Natl. Mus. Canada, Bull. 164. 132 pp. 4 pl. 1959. Price: $2.00. [113 taxa of lichens, pp. 109-122, by J. W. Thomson.]

SCOTT, G. D. Observation on spore discharge and germination in *Peltigera praetextata* (Flk.) Vain. The Lichenologist 1(3): 109-111. 1 tab. 1959. [Spore discharge and capacity for germination are not seasonal.]

SHIELDS, LORA MANGUM. Algal and lichen floras in relation to nitrogen content of certain volcanic and arid range soils. Ecology 38(4): 661-663. 2 tab. 1957. [Study of 10 lichens from New Mexico.]

ŠMARDA, J. Pozoruhodné naleziště lišejníků *Fulgensia fulgens* a *Squamaria lentigera* ve Spišské kotlině na Slovensku. [Beachtenswerter Fundort der Flechten *F. f.* und *S. l.* im Zipser Becken in der Slowakei.] Biológia [Bratislava] 13(5): 385-389. 1 map. 1958. [Russian and German summaries.]

STARR, R. C. The culture collection of algae at Indiana University. Amer. Jour. Bot. 47(1): 67-86. 1960. [Pure cultures of 23 algae from lichens: pp. 74-75.]

SWINSCOW, T. D. V. Field meeting at Chagford. The Lichenologist 1(3): 115-118. 1959. [About 70 spp.]

———. Toxicity of Pd and Bd. *Ibid.* 1(3): 120. 1959. [A warning about the use of paraphenylenediamine and benzidine.]

SZATALA, Ö. Contributions à la connaissance des lichens de la Grèce II. Mont Olympe. Ann. Hist.-Nat. Mus. Natl. Hungarici 51: 121-144. 1959. [278 spp.]

TAGAWA, H. The evaporation as an environmental factor for the epiphytic mosses in the beech forests. Jap. Jour. Ecol. 9(5): 178-184. 5 fig. 1959. [Several lichens.]

TRASS, H. Samblikest ja nende levikust. [Lichens and their distribution.] Eesti Loodus [Acad. Sci. Estonian SSR] 1959(6): 346-353. 6 fig. 1 pl. in color. 1959. [An analysis of the floristic affinities of the Estonian lichens. English summary.]

WADE, A. E. The British species of *Alectoria*. The Lichenologist 1(3): 89-97. 1959. [10 spp. Key. New: *A. pubescens* v. *reticulata* (Wulf.) n.c.]

WILHELMSEN, J. B. Practical method of closing small columns in column chromatography. Jour. Chromatography 2: 217. illus. 1959. [For use in the study of lichen chlorophylls.]

YOSHIMURA, I. Miscellaneous notes on lichens in Shikoku (1). Misc. Bryol. et Lichenol. 2(1): 5-6. 1960. [5 spp. In Japanese.]

NEWS AND NOTES

KENNETH A. WAGNER recently joined the staff of the Carolina Biological Supply Co. as Botanist and Science Co-ordinator of the newly organized Powell Laboratories in Gladstone, Ore.

WINONA WELCH left in June for an extensive trip to Alaska by way of the Canadian Rockies, Vancouver, Victoria, and the Inside Passage, with stop-overs at Mendenhall Glacier, Skagway, Haines, Lake Bennett, Whitehorse, Fairbanks, Kotzebue, Nome, McKinley National Park, Valdez, Portage Glacier, and Anchorage. On the return she planned a week of collecting in the Olympic Peninsula.

LEWIS ANDERSON spent about five months in Ottawa during the past year, working with HOWARD CRUM, on their manual of the mosses of the eastern North America, supported by NSF funds. They have completed keys and descriptions up to the Pottiaceae, a total of some 140 species. Bryologists are urged to lend material in support of interesting records or puzzling specimens for inclusion in the manual.

SAM SHUSHAN has been elected President of the Colorado-Wyoming Academy of Sciences.

JANE TAYLOR completed her degree as Doctor of Philosophy at the University of Cincinnati in June; her dissertation was titled "The genus *Lepidozia* in Latin America: a taxonomic monograph." HAROLD E. ROBINSON also completed his Ph.D. dissertation at Duke University on generic relationships in the Brachytheciaceae. Other bryologists to complete Ph.D. degrees this past spring, on non-bryological subjects, were CHARLES D. BIRD (University of Oklahoma) and WILFRED B. SCHOFIELD (Duke University).

JOHN THOMSON'S plans for the summer in the Canadian North called for visits to Lake Ennadai, Great Slave Lake (near Fort Reliance), and, if possible, Bathurst Inlet.

WILLIAM L. CULBERSON has received a National Science Foundation grant of $33,700 to support work on a monograph of the genus *Cetraria* and on a manual for the identification of lichen substances in thallus fragments. Dr. CHICITA F. CULBERSON, an organic chemist, is research associate. From June 1961 to September 1962 they will revise specimens and conduct chemical studies in herbaria and laboratories in Japan, Russia and western Europe.

Copies of Grout's books are becoming very difficult to find. JOHN JOHNSON (Natural History Books, R.D. 2, No. Bennington, Vt.) can offer copies of the *Moss Flora*, in the original wrappers, at a price of $30.00. He will gladly search for copies of *Mosses with Hand-Lens and Microscope*, although it is impossible to promise a supply.

RAYMOND E. HATCHER has been appointed Assistant Professor of Botany at the University of Wisconsin at Milwaukee.

The Smithsonian Institution has acquired ALEXANDER W. EVANS' *Cladonia* herbarium of nearly 40,000 specimens. Inquiries about the herbarium should be directed in future to Dr. Mason E. Hale.

The British Bryological Society recently prepared a Directory of

Bryological Research and Research Workers; it is available from Mr. S. W. Greene, Dept. of Botany, The University, Birmingham 15, England, at six pence.

Ronald A. Pursell (Pennsylvania State University) and William D. Reese (University of Southwestern Louisiana) have received an NSF grant for a 3-year study of the phytogeographical affinities of the mosses of the northern and northwestern coast of the Gulf of Mexico.

Volume 63, *Number* 1 (*pp.* 1-72), *was issued June* 6, 1960

AVAILABLE NOW

ALL BACK NUMBERS

OF

THE BRYOLOGIST

(Some numbers reprinted by photo offset)

COMPLETE SETS

Broken sets Individual Numbers

Price List

Volumes 1-4—$1.25 per volume
(single numbers, 35c)

Volumes 5-36—$2.50 per volume
(single numbers, 60c)

Volume 37—$3.00 per volume
(single numbers, 65c)

Volumes 38-45—$3.50 per volume
(single numbers, 85c)

Volumes 46-49—$4.00 per volume
(single numbers, $1.25)

Volume 50—$8.00 per volume
(single numbers, $2.50)

Later Volumes—$6.00 per volume
(single numbers, $2.00)

All prices net. No discounts. Postage extra.

Order from

Lewis E. Anderson
Department of Botany,
Duke University,
Durham, North Carolina.

MOSSES OF INDIANA

An Illustrated Manual

by WINONA H. WELCH

Attractively printed and strongly bound, this book is designed for beginners and specialists alike. It includes an introduction to bryology and an illustrated glossary, keys, and descriptions. The keys have been specially tailored for the identification of sterile material. 478 pp., 254 fig., 1 map. Cloth, $5.00. The Bookwalter Co., Indianapolis. 1957.

Available from the Division of Forestry, Indiana Dept. of Conservation, Indianapolis 9.

CRYPTOGAMIC BOTANY BOOKS

We buy books on all Natural History subjects, but are especially interested in books, pamphlets, and periodicals on cryptogamic botany. Lists submitted will receive a prompt reply. We pay cash or will arrange a trade. Catalogues issued.

John Johnson
R.F.D. 2
North Bennington, Vt.
U.S.A.

THE HEPATIC EXCHANGE

Beginning January 1, 1939, this Exchange has been operated under the same rules as The Moss Exchange. Privileges are available only to members of the American Bryological Society who have paid annual dues of 25c to MR. HARRY WILLIAMS, Millbrook, Ont., Canada. Only fully determined specimens in packets with complete data will be accepted. It is suggested that there be at least five packets of each species with an extra which will be forwarded to the Curator of Hepatics for the American Bryological Society Hepatic Herbarium. All material for determination should be sent to the Curator of Hepatics, DR. MARGARET FULFORD, Department of Botany, University of Cincinnati, Cincinnati, Ohio.

THE MOSS EXCHANGE

As announced in THE BRYOLOGIST **38**: 100, Sept.-Oct., 1935, there is now an exchange for mosses. This exchange is available to members of the American Bryological Society upon payment of annual dues of 25c to DR. E. H. KETCHLEDGE, Dept of Forest Botany, State College of Forestry, Syracuse 10, New York. Only fully identified specimens in packets with complete data on them should be sent in. It is suggested that there be five or more packets of each species.

These two exchanges offer an excellent opportunity for A.B.S. members to build up their own herbaria of choice, well-labelled specimens